United States
Department of
Agriculture

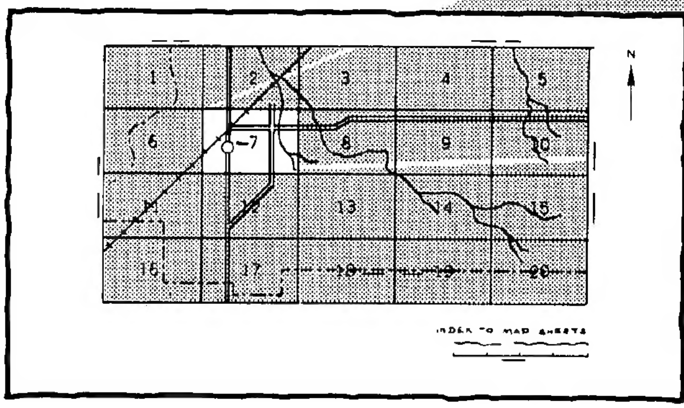
Soil
Conservation
Service

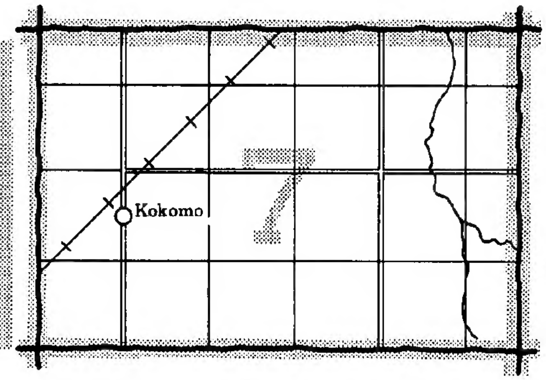
In cooperation with
University of Florida,
Institute of Food and
Agricultural Sciences,
Agricultural Experiment
Stations and Soil Science
Department,
and Florida Department of
Agriculture and Consumer
Services

Soil Survey of Hardee County Florida

HOW TO USE

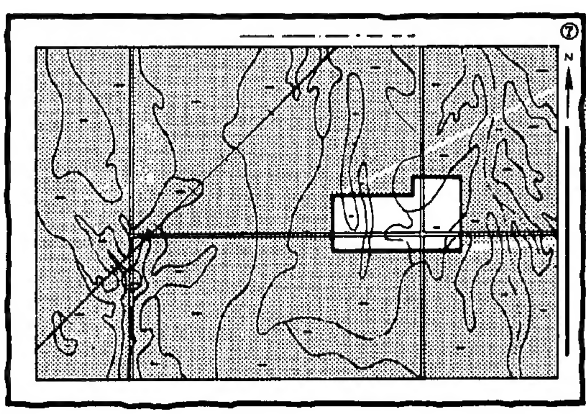
1. Locate your area of interest on the "Index to Map Sheets"

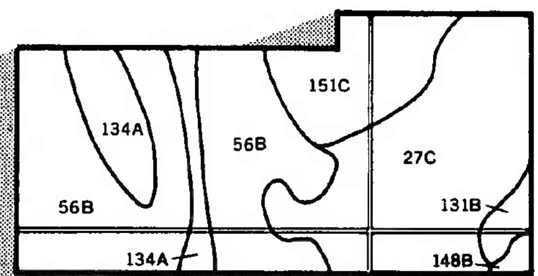




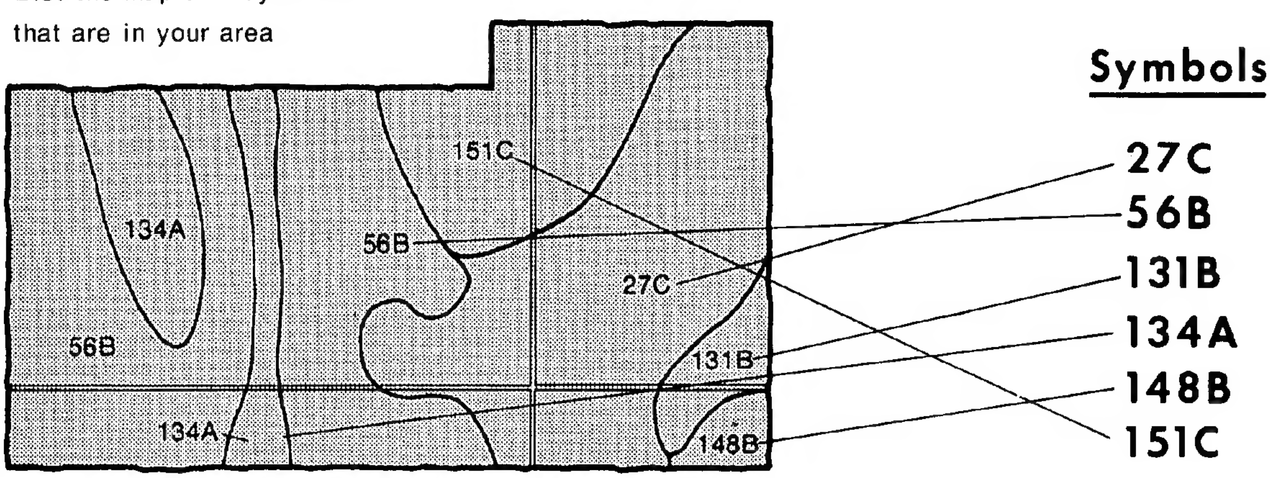
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



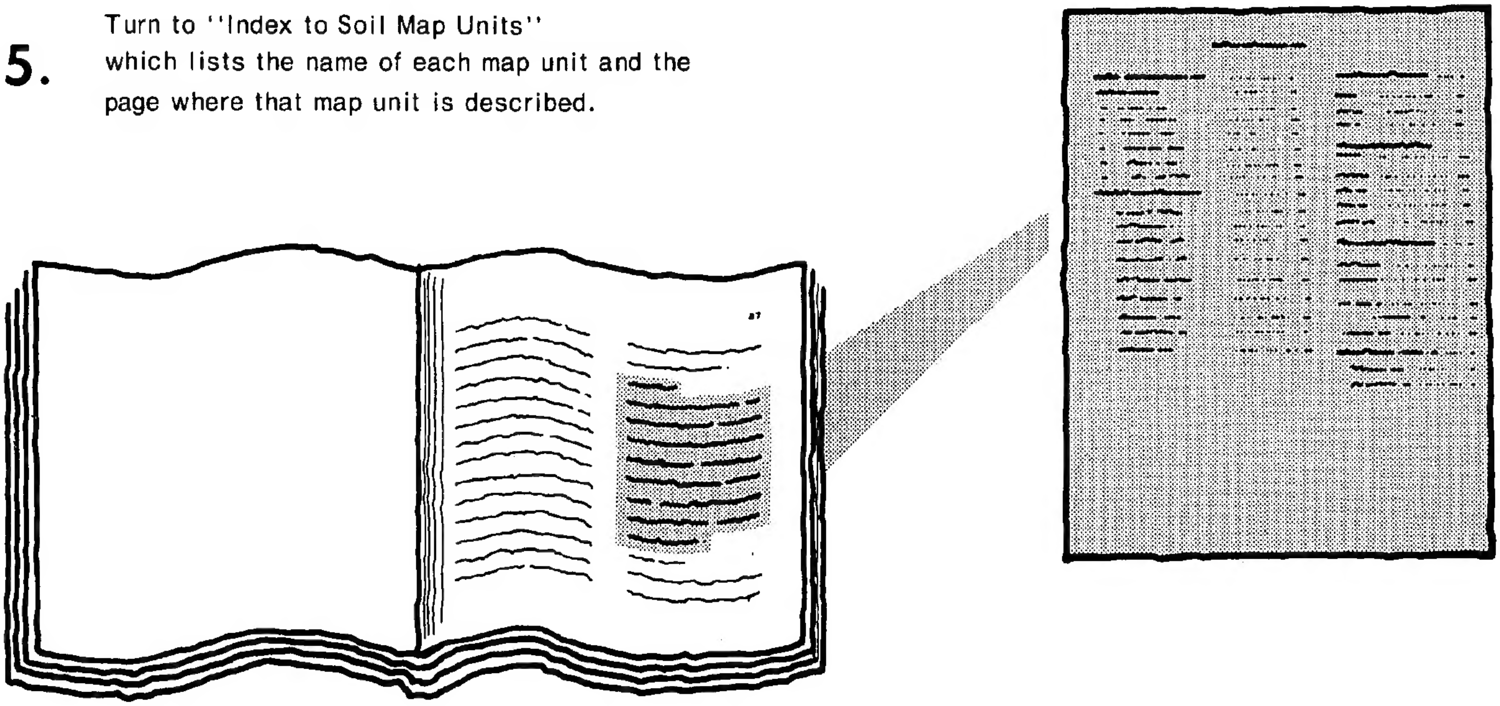


4. List the map unit symbols that are in your area

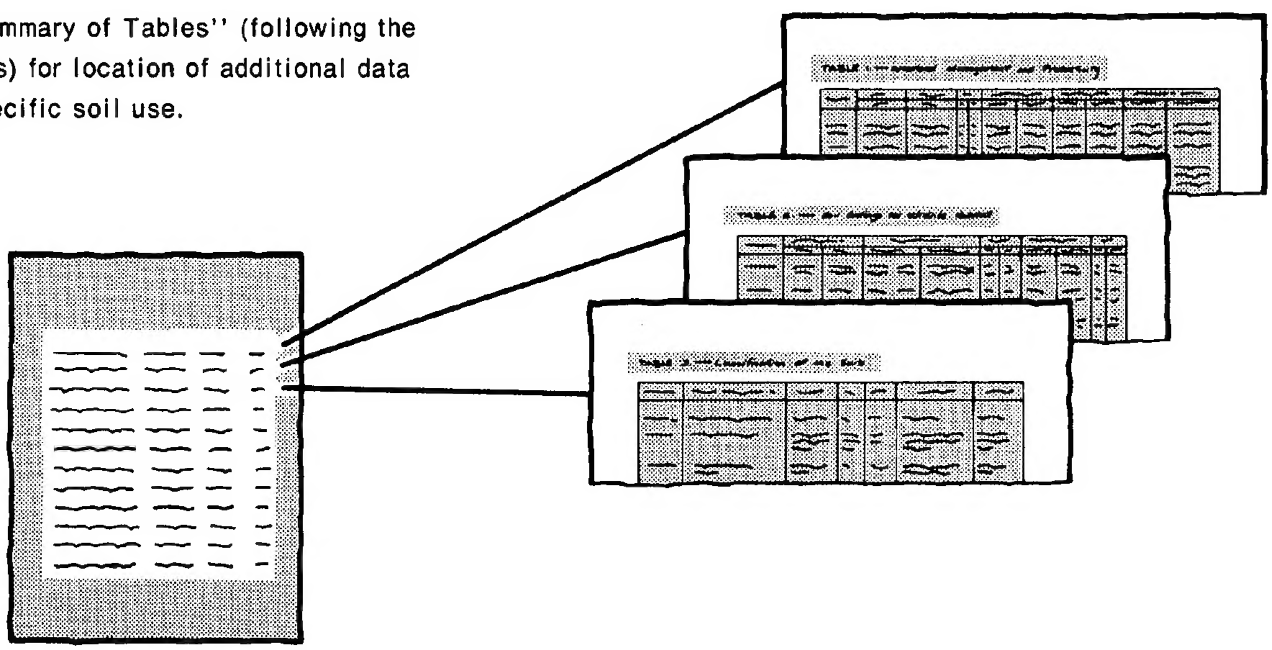


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1980. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made by the Soil Conservation Service in cooperation with the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations and Soil Science Department, and the Florida Department of Agriculture and Consumer Services. It is part of the technical assistance furnished to the Hardee Soil and Water Conservation District. The Hardee County Board of Commissioners contributed financially to accelerate the completion of fieldwork for the soil survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Improved pasture of bahiagrass. The soil is Myakka fine sand.

Contents

Soil Series

Issued June 1984

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Hardee County, Florida. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

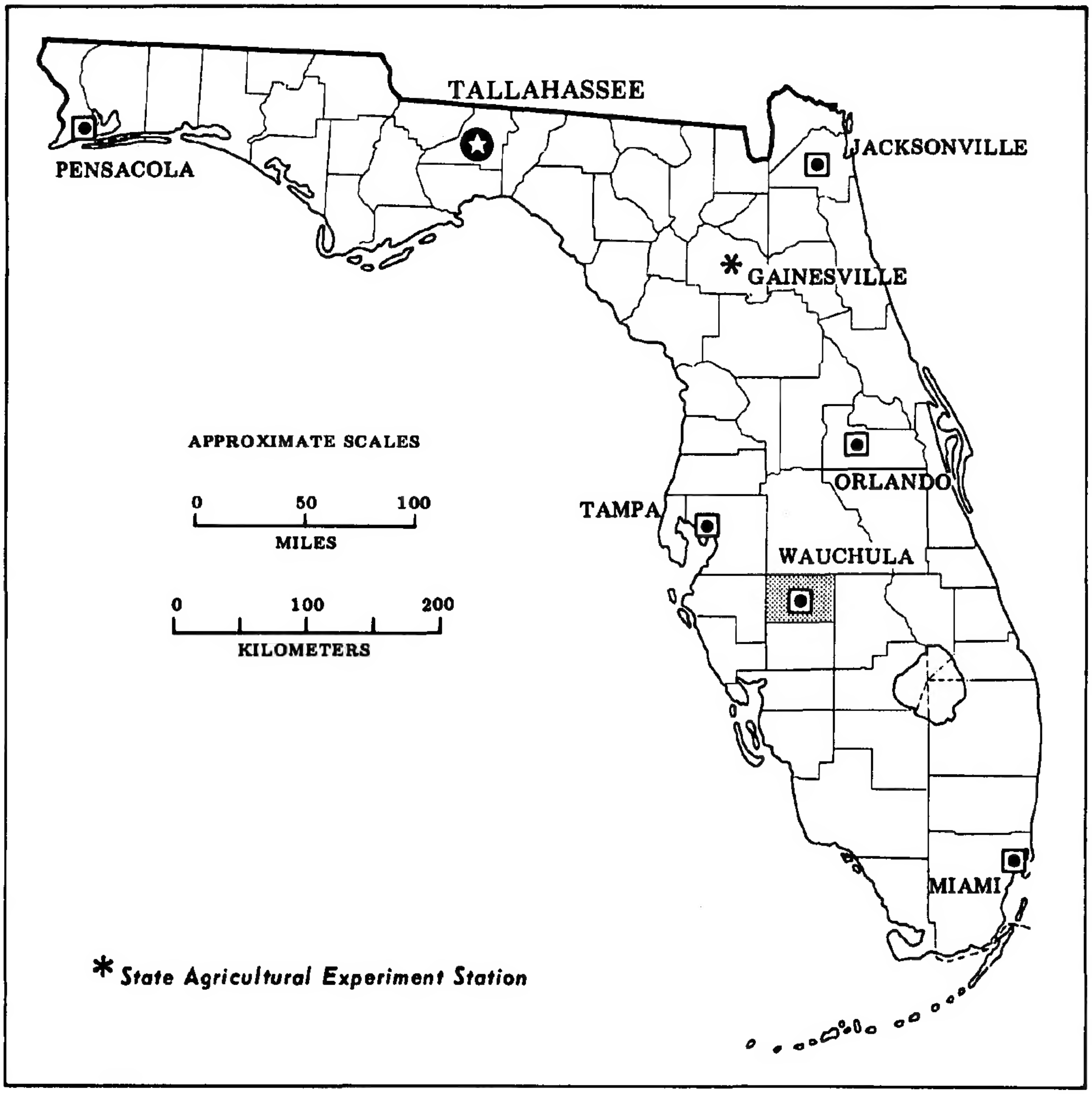
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

James W. Mitchell

James W. Mitchell
State Conservationist
Soil Conservation Service



Location of Hardee County in Florida.

Soil survey of
Hardee County, Florida

By John M. Robbins, Jr., Richard D. Ford, Jeffrey T. Werner, and W. Dean Cowherd,
Soil Conservation Service

Participating in the fieldwork were Earl S. Vanatta, James Schultzetenberg,
Warren Henderson, and Clifford Landers,
Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with
University of Florida, Institute of Food and Agricultural Sciences,
Agricultural Experiment Stations and Soil Science Department, and
Florida Department of Agriculture and Consumer Services

HARDEE COUNTY is in the south-central part of peninsular Florida. It is bisected by the Peace River. It is bordered on the north by Polk County, on the west by Manatee County, on the south by De Soto County, and on the east by Highlands County. Hardee County covers 403,200 acres, about 630 square miles. It has 376 acres of water in bodies of less than 40 acres. The county is about 21 miles long and 30 miles wide. Wauchula, the county seat, is in the north-central part of the county.

The economy of Hardee County is based on agriculture and agriculture-related enterprises.

General Nature of the County

In this section, environmental and cultural factors that affect the use and management of the soils in Hardee County are described. These factors are climate; history; physiography, relief, and drainage; water resources; farming; and transportation.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Wauchula in the period 1932 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring (*14*).

In winter the average temperature is 62 degrees F, and the average daily minimum temperature is 52 degrees. The lowest temperature on record, which occurred at Wauchula on December 13, 1962, is 20 degrees. In summer the average temperature is 82 degrees, and the average daily maximum temperature is 91 degrees. The highest recorded temperature, which occurred at Ona on May 31, 1945, is 103 degrees.

The total annual precipitation is 53.52 inches. Of this, 39.47 inches, or 72 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 39 inches. The heaviest 1-day rainfall during the period of record was 10.12 inches at Wauchula in June 1945. Thunderstorms occur on about 100 days each year, and most occur in July.

Snowfall is rare. In 90 percent of the winters, there is no measurable snowfall. In 10 percent, the snowfall, usually of short duration, is less than 1 inch.

The average relative humidity in midafternoon is about 57 percent. Humidity is higher at night, and the average at dawn is about 87 percent. The sun shines 61 percent of the time possible in summer and 63 percent in winter. The prevailing wind is from the east-northeast. Average windspeed is highest, 7.8 miles per hour, in March.

History

In the late 1840's, settlement began in the area that is now Hardee County (*5, 6*). In the late 1860's the first school in the area was established on the road between Wauchula and Ona. In the mid-1880's the railroad was extended into the area.

Hardee County was established on April 23, 1921, the result of a land division that created Hardee, De Soto, Charlotte, Highlands, and Glades Counties. Wauchula was established as the county seat on December 30, 1921.

Physiography, Relief, and Drainage

Hardee County is divided into two major physiographic regions: the Polk Upland and the De Soto Plain (*15*).

The Polk Upland nearly covers the northern half of the county. It is roughly square in shape and is surrounded by lower ground on three sides. Except for these lower areas, the elevation generally is between 100 and 130 feet. An inconspicuous but persistent outfacing scarp separates the Polk Upland from the De Soto Plain. The toe of the scarp is about 75 to 80 feet high. The crest varies somewhat more in elevation and generally is more than 100 feet high. The scarp is quite irregular, and its origin is not clear. Most likely it is an erosional marring scarp made by the shoreline of the Gulf of Mexico at Wicomico sea level.

The Bone Valley Formation underlies most of the Polk Upland and much of the De Soto Plain. It has deposits of phosphate. Its siliclastic composition has influenced the topographic character of Hardee County. The effects of solution are not so intense as they generally are throughout peninsular Florida, and there is more branching of surface streams. The Peace River, Horse Creek, and Charlie Creek have widely branching tributaries and contribute to the drainage of the county. Topographic dissection in the Polk Upland generally ranges to about 50 feet. It is much less in the De Soto Plain.

The De Soto Plain covers the southern part of the county. Its incline is gradual; the vertical drop is 30 feet every 5 or 6 miles. The plain has all the characteristics of a major scarp except abruptness. In Hardee County the elevation of the plain generally ranges from 40 to 85 feet. The De Soto Plain is a submarine plain that was formed most likely at Wicomico sea level. The absence of beach ridges throughout the plain indicates submarine origin. In Hardee County the Peace River is entrenched to a depth of 30 to 40 feet throughout the plain.

Water Resources

The Peace River, Horse Creek, and Charlie Creek are the major permanent streams and surface drainage systems in the county. There are numerous small streams and creeks along the major streams.

The Floridian Aquifer is the primary source of all underground water in central Florida (*4*). The shallow aquifers that overlie the Floridian Aquifer, including the surficial sands and the upper region of the Hawthorn Formation, are secondary sources.

Wells provide the water supply for towns, communities, and individual homes within the county. The wells are dug into the underlying limestone to the aquifer and then cased to the limestone. The depth of the wells varies, but most of the wells are 80 to 100 feet deep.

Farming

Tilman W. Robinson, district conservationist, Soil Conservation Service, helped prepare this section.

The soils and climate in Hardee County are suited to various agricultural enterprises, including growing vegetable crops and citrus and raising cattle (*7, 8*).

Crops such as cucumbers, yellow squash, zucchini squash, bell peppers, cabbage, and watermelons are grown on thousands of acres. Cucumbers are the main crop. Strawberries, field peas, sweet corn, and tomatoes are grown to a lesser extent. Most vegetable crops are grown on soils in the flatwoods, but drainage and irrigation are required.

Citrus is grown on more than 45,000 acres. Most of the better citrus is produced on Tavares fine sand, 0 to 5 percent slopes. However, citrus is also grown on soils in the flatwoods that have a high water table, but bedding, open ditch or closed drainage systems, and irrigation are needed for highest yields.

Raising beef cattle, mainly cow-calf herds, is a major agricultural enterprise in the county. Currently 80,000 head of cattle graze mainly on improved pasture; however, part of a large acreage of native range is managed to improve the better native grasses. Subsurface irrigation systems that use water pumped from deep wells are used on large acreages of improved pasture—mainly pangolagrass and white clover.

The dairy industry in the county is growing but is still comparatively small.

Ornamental plant nurseries are becoming increasingly important in agriculture in the county. Several large nurseries presently are in operation.

Forest products, mostly pulpwood, also are produced in the county. There are no large tracts of woodland in the county, but most of the forests in the extensive areas that are used as native range are naturally regenerated. Some of the smaller trees are used in the production of treated posts by a plant in Ona.

Swine, horses, and poultry, in small numbers, are raised in the county, and some honey is produced.

Transportation

Several county, state, and federal highways provide ready access between population centers within the

county and between the county and the rest of the state. Several trucking firms that have facilities for handling interstate trade serve the county. Rail and bus service are available. Scheduled airline service is available at Tampa International Airport. The Wauchula Airport is used mainly by private planes.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of

other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Zolfo-Tavares

Nearly level to gently sloping, somewhat poorly drained and moderately well drained soils that are sandy throughout

This map unit consists of broad sandhill areas on uplands. Most areas are along U.S. 17 from Bowling Green, in the northern part of the county, to Zolfo Springs, in the south-central part. Other areas are near Lemon Grove and Fort Green Springs.

This unit consists of broad, nearly level to gently sloping, deep sandy soils that are intermixed with small areas of poorly drained soils. The natural vegetation is slash pine, longleaf pine, live oak, laurel oak, water oak, magnolia, hickory, and dogwood and an understory of native grasses and annual forbs.

This unit takes in about 33,000 acres, or about 8 percent of the county. It is about 54 percent Zolfo soils, 21 percent Tavares soils, and 25 percent soils of minor extent.

Zolfo soils are somewhat poorly drained. Typically, the surface layer is dark grayish brown fine sand about 7 inches thick. The subsurface layer is fine sand about 56 inches thick. It is grayish brown in the upper 21 inches, very pale brown in the middle 17 inches, and light brownish gray in the lower 18 inches. The subsoil is fine sand. It is dark brown to a depth of 68 inches and black to a depth of 80 inches or more.

Tavares soils are moderately well drained. Typically, the surface layer is dark grayish brown fine sand about 7 inches thick. The underlying material is light yellowish brown fine sand to a depth of 16 inches, very pale brown fine sand to a depth of 50 inches, and white fine sand to a depth of 80 inches or more.

The soils of minor extent are Adamsville, Apopka, Candler, Electra, and Sparr soils.

The soils making up this unit are used mainly for citrus or improved pasture. In some areas they are used for residential and urban development. In a few places they are used for truck crops.

2. Smyrna-Myakka-Ona

Nearly level, poorly drained soils that are sandy throughout and that have a dark colored subsoil at a depth of less than 30 inches

This map unit consists of nearly level pine and sawpalmetto flatwoods interspersed with small, grassy, wet depressions and cypress and hardwood swamps. Some of the depressions are connected by narrow, wet drainageways. This unit is scattered throughout the county.

The natural vegetation in the broad flatwoods is longleaf pine, slash pine, sawpalmetto, waxmyrtle, inkberry, running oak, and native grasses. In grassy depressions it is mainly maidencane and St. John's-wort, and in the swampy areas the natural vegetation is cypress, bay, and gum trees.

This map unit takes in about 151,700 acres, or about 38 percent of the county. It is about 36 percent Smyrna soils, 25 percent Myakka soils, 9 percent Ona soils, and 30 percent soils of minor extent.

Smyrna soils are poorly drained. Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is light gray sand about 11 inches thick. The subsoil is organic-coated sand to a depth of about 29 inches. In the upper 4 inches it is black; in the middle 4 inches it is dark reddish brown; and in the lower 5 inches it is dark brown. The next layer to a depth of 48 inches is light gray fine sand. The subsoil in the lower part is dark brown fine sand to a depth of 80 inches or more.

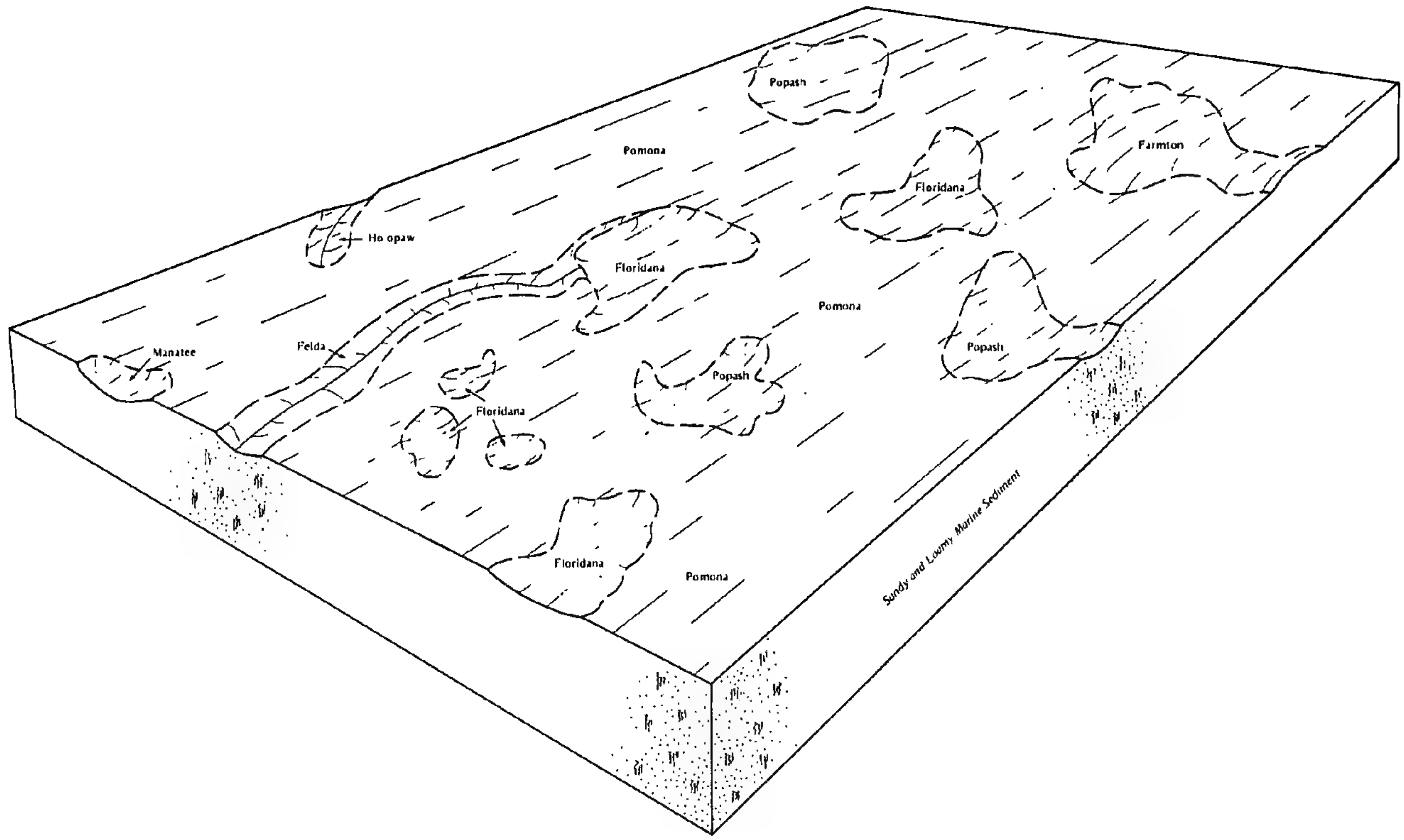


Figure 1.—Relationship of soils to topography and parent material in the Pomona-Floridana-Popash general soil map unit.

Myakka soils are poorly drained. Typically, the surface layer is very dark gray fine sand about 3 inches thick. The subsurface layer is light gray fine sand about 17 inches thick. The subsoil is fine sand about 25 inches thick. In the upper 4 inches it is very dark brown, in the next 4 inches it is dark reddish brown, in the next 5 inches it is brown, and in the lowermost 12 inches it is yellowish brown. The substratum is light brownish gray fine sand to a depth of 80 inches or more.

Ona soils are poorly drained. Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsoil is dark reddish brown to brown fine sand to a depth of 47 inches and black fine sand to a depth of 80 inches or more.

The soils of minor extent are Basinger, Immokalee, Placid, and Pompano soils.

The soils making up this map unit are used mainly for improved pasture. In some areas they are still in natural vegetation and are used as native range. In other areas they have been cleared and bedded and are used for citrus and cultivated crops. In a few areas they are used for residential development. In the wooded areas they provide food and cover for wildlife, especially for birds and small animals.

3. Pomona-Floridana-Popash

Nearly level, poorly drained and very poorly drained sandy soils; some have a dark colored subsoil at a depth of less than 30 inches over loamy material, and some are sandy to a depth of 20 to more than 40 inches and are loamy below

This map unit consists of nearly level pine and sawpalmetto flatwoods interspersed with small, grassy, wet depressions, cypress ponds, and swamps (fig. 1). Some of the depressions are connected by narrow, wet drainageways. This unit is scattered throughout the county.

The natural vegetation in the broad, poorly drained flatwoods is longleaf pine, South Florida slash pine, sawpalmetto, waxmyrtle, inkberry, running oak, and native grasses. In the depressions the natural vegetation is mainly maidencane and St. John's-wort, and in the swamps it is mainly cypress, bay, and gum trees.

This map unit takes in about 150,500 acres, or about 37 percent of the county. It is about 48 percent Pomona soils, 6 percent Floridana soils, 4 percent Popash soils, and 42 percent soils of minor extent.

Pomona soils are poorly drained. Typically, the surface layer is black fine sand about 3 inches thick. The

subsurface layer is gray fine sand about 24 inches thick. The subsoil in the upper part to a depth of 46 inches is dark reddish brown fine sand coated with organic matter and brown fine sand. The subsoil in the lower part is gray fine sandy loam to a depth of 80 inches or more. Between the upper part of the subsoil and the lower part, there is a layer of brown fine sand about 11 inches thick. The layer has many coarse distinct black bodies.

Floridana soils are very poorly drained. Typically, the surface layer is about 15 inches thick. In the upper 4 inches it is black mucky fine sand, and in the lower 11 inches it is very dark gray fine sand. The subsurface layer is gray fine sand about 17 inches thick. The subsoil is dark gray sandy clay loam to a depth of 44 inches and gray sandy loam to a depth of 80 inches or more. It has lenses and pockets of loamy fine sand and fine sand.

Popash soils are very poorly drained. Typically, the surface layer in the upper 8 inches is black mucky fine sand, and in the lower 11 inches it is black fine sand. The subsurface layer is gray fine sand about 25 inches thick. The subsoil to a depth of 60 inches is grayish brown sandy clay loam, and to a depth of 80 inches it is light brownish gray fine sandy loam.

The soils of minor extent are Farmton, Felda, Holopaw, and Manatee soils.

The soils making up this map unit are used mainly for improved pasture. In some areas they have been cleared and bedded and are used for citrus and cultivated crops. In some areas they are still in natural vegetation and are used as native range. In a few areas they are used for residential development. In wooded areas they provide food and cover for wildlife, especially for birds and small animals.

4. Immokalee-Pomello-Myakka

Nearly level, poorly drained and moderately well drained soils that are sandy throughout; some have a dark colored subsoil at a depth of 30 to 50 inches, and some at a depth of less than 30 inches

This map unit consists of nearly level pine and sawpalmetto flatwoods, occasional ridges and knolls, and interspersed small, grassy, wet depressions, cypress ponds, and swamps. Some of the depressions are connected by narrow, wet drainageways. The areas, which are scattered throughout the county, are strips 1 to 2 miles wide that generally parallel the major streams at a distance of 1 to 3 miles.

In the flatwoods the natural vegetation is longleaf pine, South Florida slash pine, scrub oak, dwarf live oak, sawpalmetto, waxmyrtle, inkberry, running oak, and native grasses. In the depressions the native vegetation is mainly maidencane and St. John's-wort, and in the swamps it is mainly cypress, bay, and gum trees. On ridges and knolls the vegetation is mainly scrub oak and dwarf live oak.

This map unit takes in about 24,500 acres, or about 6 percent of the county. It is about 41 percent Immokalee soils, 15 percent Pomello soils, 11 percent Myakka soils, and 33 percent soils of minor extent.

Immokalee soils are poorly drained. Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is gray fine sand about 39 inches thick. The subsoil is black fine sand to a depth of 48 inches and is dark reddish brown fine sand to a depth of 80 inches.

Pomello soils are moderately well drained. Typically, the surface layer is dark gray fine sand about 6 inches thick. The subsurface layer is fine sand about 35 inches thick. In the upper 10 inches it is gray, and in the lower 25 inches it is white. The subsoil in the upper part is black fine sand to a depth of 58 inches, and in the lower part it is black fine sand to a depth of 80 inches. An 8-inch layer of gray fine sand separates the two parts.

Myakka soils are poorly drained. Typically, the surface layer is very dark gray fine sand about 3 inches thick. The subsurface layer is light gray fine sand about 17 inches thick. The subsoil is fine sand about 25 inches thick. In the upper 4 inches it is very dark brown, in the next 4 inches it is dark reddish brown, in the next 5 inches it is brown, and in the lower 12 inches it is yellowish brown. The substratum is light brownish gray fine sand to a depth of 80 inches.

The soils of minor extent are Cassia, Electra, Jonathan, and St. Lucie soils.

The soils making up this map unit are used mainly for improved pasture and citrus. In the remaining areas they are mainly in natural vegetation. In some areas they are used for residential development, and in a few areas they are used for cultivated crops. In wooded areas they provide cover and a fair supply of food for wildlife.

5. Bradenton-Felda-Chobee

Nearly level, poorly drained and very poorly drained soils; some are sandy to a depth of 20 to 40 inches and are loamy below, and some are loamy throughout; subject to frequent flooding

This map unit consists of low first bottoms of rivers and streams. The areas are interspersed with shallow river and creek channels and are flooded frequently. They are along streams and rivers throughout the county and are adjacent to the Peace River, Horse Creek, and Charlie Creek.

The natural vegetation is dense, consisting of water oak, cypress, cabbage palm, sweetgum, hickory, red maple, cutgrass maidencane, sawgrass, swamp primrose, buttonbush, smartweed, sedges, and other water-tolerant plants.

This unit takes in about 35,700 acres, or about 9 percent of the county. It is about 30 percent Bradenton soils, 25 percent Felda soils, 25 percent Chobee soils, and 20 percent soils of minor extent.

Bradenton soils are poorly drained. Typically, the surface layer is dark gray fine sand about 6 inches thick.

The subsurface layer is grayish brown fine sand about 10 inches thick. The subsoil is light brownish gray sandy clay loam about 13 inches thick. The substratum is gray sandy clay loam to a depth of 80 inches.

Felda soils are poorly drained. Typically, the surface layer is black fine sand about 5 inches thick. The subsurface layer is fine sand about 21 inches thick. In the upper 5 inches it is grayish brown, and in the lower 16 inches it is light gray. The subsoil is sandy loam about 22 inches thick. In the upper 10 inches it is gray, and in the lower 12 inches it is grayish brown. The substratum is light gray fine sand to a depth of 80 inches.

Chobee soils are very poorly drained. Typically, the surface layer is black sandy clay loam about 22 inches thick. The subsoil is dark gray sandy clay loam to a depth of 40 inches and gray sandy clay loam to a depth of 80 inches.

The soils of minor extent are Ft. Green, Holopaw, Kaliga, Wabasso, and Wauchula soils.

The soils making up this map unit are in natural vegetation. In some areas they are used as range and native pasture. They are too wet to be used for pine trees. They provide habitat for waterfowl. Cranes and herons are common throughout the year, and ducks are common in winter.

6. Kaliga-Samsula

Nearly level, very poorly drained organic soils; the organic material extends to a depth of 16 to 51 inches; some soils are underlain by loamy material, and some by sandy material

This map unit consists of nearly level, freshwater hardwood and cypress swamps. The areas are scattered throughout the county but generally are at the head of the numerous creeks. They are 1/2 to 2 miles wide, and most are covered by water except during extended dry periods.

The natural vegetation consists of sweetbay, sweet gum, cypress, various pines, cabbage palm, water oak, hickory, magnolia, and cedar and an understory of maidencane, cattail, sawgrass, royal fern, cinnamon fern, sawpalmetto, goat vine, muscadine vine, inkberry, and various aquatic plants.

This map unit takes in about 7,800 acres, or about 2 percent of the county. It is about 70 percent Kaliga soils, 20 percent Samsula soils, and 10 percent soils of minor extent.

Kaliga soils are very poorly drained. Typically, the surface layer is black muck about 28 inches thick. Below the muck there is very dark grayish brown loamy fine sand to a depth of 34 inches and dark gray sandy clay loam to a depth of 80 inches.

Samsula soils are very poorly drained. Typically, the surface layer is black muck about 25 inches thick. Below the muck there is fine sand to a depth of 65 inches or more. In the upper 8 inches the fine sand is black. Below that, it is light gray.

The soils of minor extent are Floridana, Hontoon, Manatee, and Popash soils.

The soils making up this unit are mainly in natural vegetation. In a few areas that have been cleared and drained, they are used for pasture and truck crops. These soils provide habitat for waterfowl. Cranes and herons are common throughout the year, and ducks are common in winter.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Felda fine sand is one of several phases in the Felda series.

Some map units are made up of two or more major soils. These map units are called soil associations. A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it is not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Bradenton-Felda-Chobee association, frequently flooded, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 3 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

1—Adamsville fine sand. This is a somewhat poorly drained soil on low, broad flats that are less than 2 feet higher than adjacent sloughs. Slopes generally are less than 2 percent.

Typically, the surface layer is dark gray fine sand about 7 inches thick. The underlying material is very pale brown to light gray fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Pompano, Tavares, and Zolfo soils. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years this Adamsville soil has a water table at a depth of 20 to 40 inches for 2 to 6 months. The water table rises to within 20 inches of the surface for less than 2 weeks during very wet seasons and recedes to a depth of more than 40 inches during dry periods. The available water capacity is low. Natural fertility is low. Permeability is rapid.

This soil, in most areas, has been cleared and is used for citrus, improved pasture, and truck crops. The natural vegetation is mainly slash pine, laurel, and water oak and an understory of sawpalmetto and pineland threeawn.

The potential of this soil for citrus trees is high if a water control system can remove excess water from the soil rapidly to a depth of about 4 feet. The trees should be planted in beds. A cover of close-growing vegetation should be maintained between the trees to protect the

soil from blowing in dry weather and from washing during heavy rains. Regular applications of fertilizer are needed, and for highest yields, irrigation is needed in seasons of low rainfall.

The potential of this soil for improved pasture is medium if a simple water control system can remove excess surface water in times of heavy rainfall. Regular applications of fertilizer are needed. Grazing should be controlled to maintain healthy plants for highest yields.

This soil has moderately high potential productivity for longleaf pine and especially for slash pine. It is not more productive because of the low fertility. The main management concerns are equipment limitations, seedling mortality, and plant competition.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IIIw.

2—Zolfo fine sand. This is a somewhat poorly drained, nearly level soil on broad ridges and knolls on uplands. Individual areas are irregular in shape and range from 10 to 100 acres in size. Slopes are less than 2 percent.

Typically, the surface layer is dark grayish brown fine sand about 7 inches thick. The subsurface layer is fine sand about 56 inches thick. It is grayish brown in the upper 21 inches, very pale brown in the middle 17 inches, and light brownish gray in the lower 18 inches. The subsoil is dark brown fine sand to a depth of 68 inches and black fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Adamsville, Myakka, Ona, Pomello, and Tavares soils. In 80 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent.

The Zolfo soil has a water table at a depth of 20 to 40 inches for 2 to 6 months. The water table rises to within 20 inches of the surface for less than 2 weeks during very wet seasons and recedes to a depth of more than 40 inches during very dry periods. Permeability is very rapid in the surface layer and moderate in the subsoil. The available water capacity is low, and natural fertility is low.

This soil is used mainly for citrus and improved pasture. The natural vegetation includes longleaf and slash pine, scattered blackjack, turkey, and post oak, and an undercover of pineland threeawn.

Periodic wetness is a severe limitation to use of this soil for cultivated crops. Unless intensive water control measures are used, the kinds of crops that can be grown are very limited. The potential for crops is medium if a water control system can remove excess water in wet seasons. Cover crops and the residue of all other crops are needed to protect the soil from erosion. Additions of fertilizer and lime should be based on the needs of the crop.

The potential of this soil for citrus trees is high if a water control system can remove excess water from the soil rapidly to a depth of about 4 feet (fig. 2). The trees should be planted in beds. A cover of close-growing vegetation should be maintained between the trees to protect the soil from blowing during dry weather and from washing during heavy rains. Regular applications of fertilizer are needed, and for highest yields, irrigation is needed in seasons of low rainfall.

The potential of this soil for improved pasture is medium. A simple water control system is needed to remove excess surface water in times of heavy rainfall. Regular fertilization is also needed. Grazing should be carefully controlled to maintain healthy plants for highest yields.

This soil has moderately high potential productivity for longleaf pine and especially for slash pine. It is not more productive because of low fertility.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IIIw.

3—Ft. Green fine sand, 2 to 5 percent slopes. This is a gently sloping, poorly drained soil on side slopes adjacent to flood plains and depressions. The individual areas are mostly long and narrow and generally are parallel to the flood plains or are adjacent to the depressions. The individual areas range from 5 to 20 acres in size.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer in the upper part is grayish brown fine sand 11 inches thick and in the lower part is light brownish gray fine sand 14 inches thick. The subsoil is light gray to a depth of 80 inches. The upper 11 inches is cobbly sandy clay loam, the middle 10 inches is sandy clay loam, and the lower 28 inches is fine sandy loam.

Included with this soil in mapping are small areas of similar soils that have slopes of less than 2 percent or more than 5 percent. Also included are small areas of Bradenton, Pomona, and Wabasso soils. In 80 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 10 percent or more than 15 percent.

The Ft. Green soil has a water table within 10 inches of the surface for 1 to 4 months. Permeability is slow or moderately slow. The available water capacity is moderate, and natural fertility is moderate.

Figure 2.—Citrus is a major crop on Zolfo fine sand.

This soil is used mainly as range and woodland. In some areas it is used for improved pasture. The natural vegetation consists mainly of oak, longleaf and slash pine, cabbage palm, and sawpalmetto and grasses, vines, and shrubs.

Under natural conditions, this soil is not suitable for cultivated crops. The high water table restricts root development. Cobbles and boulders on the surface and in the soil are limitations to use of equipment. Drainage and removal of stones are needed before crops can be grown successfully.

This soil has high potential for improved pasture grasses if a water control system can be installed. In some areas, cobbles and boulders are limitations to use of equipment. Coastal bermudagrass, bahiagrass, and clovers grow well under proper management.

This soil has moderately high potential productivity for slash and longleaf pine. During wet seasons use of equipment is limited. Seedling mortality and plant competition are severe.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IIIw.

4—Apopka fine sand, 0 to 5 percent slopes. This is a nearly level to gently sloping, well drained soil on uplands throughout the county. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is dark gray fine sand about 8 inches thick. The subsurface layer is yellowish brown to very pale brown fine sand 47 inches thick. The subsoil is yellow loamy fine sand to a depth of 65 inches and strong brown, brownish yellow, and reddish yellow sandy clay loam to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Candler and Sparr soils. In 90 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 10 percent of the mapped areas, the included soils make up either less than 10 percent or more than 15 percent.

The available water capacity is very low in the surface and subsurface layers and moderate in the subsoil. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. Natural fertility is low. The water table is at a depth of more than 80 inches.

This soil is used mainly for citrus and improved pasture. The natural vegetation consists mainly of bluejack, turkey, post, and live oak, longleaf pine, and an understory of bluestem, paspalum, and other native grasses.

Droughtiness and rapid leaching of plant nutrients are severe limitations to use of this soil for cultivated crops. The potential for crops is medium if good management practices are followed and if irrigation is used during dry seasons if water for irrigation is available. Cultivated crops should be planted on the contour in alternating strips with close-growing crops. The cropping sequence should keep close-growing vegetation on the soil at least two-thirds of the time. Soil-improving crops should be grown, and all crop residue should be left on the surface or plowed under. Frequent fertilizing and liming are needed.

This soil has high potential for citrus trees. A ground cover of close-growing plants is needed between the trees to protect the soil from blowing. Good yields can usually be obtained without irrigation, but for increased yields, irrigation should be used if water for irrigation is readily available.

The potential of this soil is medium for improved pasture grasses if deep-rooting grasses such as Coastal bermudagrass and bahiagrass are planted. Yields are occasionally restricted by extreme droughts. Controlled grazing helps to maintain vigorous plants for highest yields.

This soil has moderately high potential productivity for longleaf pine and especially for slash pine. The major management concerns because of the sandy texture of the soil are the establishment of seedlings and the movement of equipment.

If used as range, this soil has moderate potential for forage. The quantity and quality of forage are poor.

This soil is in capability subclass IIIs.

5—Tavares fine sand, 0 to 5 percent slopes. This is a moderately well drained soil on low ridges and knolls throughout the county. Individual areas are irregular in shape and range from 5 to 40 acres in size. Slopes are smooth to concave.

Typically, the surface layer is very dark grayish brown fine sand about 5 inches thick. The underlying material to a depth of 80 inches is fine sand. The upper 19 inches is light yellowish brown, the next 26 inches is very pale brown, the next 19 inches is white, and the lower 11 inches is very pale brown.

Included with this soil in mapping are small areas of Adamsville, Candler, Sparr, and Zolfo soils. Also included are a few areas of soils that have a dark surface layer more than 10 inches thick. In 80 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent.

In most years this Tavares soil has a water table at a depth of 40 to 80 inches for 6 to 10 months and at a depth below 80 inches during very dry periods. The available water capacity is very low, and natural fertility is low. Permeability is rapid.

In most areas this soil has been cleared and is used for citrus and improved pasture. The natural vegetation includes slash and longleaf pine, blackjack, turkey, and post oak, and an understory of pineland threeawn, low panicums, and broomsedge bluestem.

This soil has low potential for most cultivated crops. Droughtiness and rapid leaching of plant nutrients limit the kinds and potential yields of crops that can be grown. Good management practices include planting row crops on the contour and alternate strips of close-growing crops. The cropping sequence should include close-growing crops at least two-thirds of the time. All crops should be fertilized and limed. Cover crops and all crop residue are needed to help to control erosion. Irrigation of high-value crops is usually feasible if water is readily available.

The potential of this soil for citrus trees is high. A ground cover of close-growing vegetation is needed between the trees to help control erosion. Citrus can usually be grown without irrigation, but for optimum yields, irrigation should be used if water is readily available. Additions of fertilizer and lime are needed.

The potential of this soil for improved pasture is medium. Pangolagrass, Coastal bermudagrass, and bahiagrass are well adapted. Yields are good if the soil is fertilized and limed. Controlled grazing is needed to maintain vigorous plants for maximum yields.

This soil has moderately high potential productivity for pine trees, especially for slash pine. Management concerns are mobility of equipment, seedling mortality, and plant competition.

If used as range, this soil has moderate potential for forage. The quantity and quality of the forage are poor.

This soil is in capability subclass IIIs.

6—Candler fine sand, 0 to 5 percent slopes. This is a nearly level to gently sloping, excessively drained soil in small to very large areas on uplands. Slopes are smooth to concave.

Typically, the surface layer is very dark grayish brown fine sand about 7 inches thick. The subsurface layer is fine sand to a depth of about 48 inches. The upper 28 inches is yellowish brown, and the lower 13 inches is yellow. At a depth below 48 inches there is yellow fine sand that has lamellae of yellowish brown loamy fine sand about 1/16 to 1/8 inch thick and 1 to 4 inches long, and at a depth below 66 inches there are white mottles.

Included with this soil in mapping are small areas of Apopka and Tavares soils and small areas of Candler soils that have slopes of more than 5 percent. In 80 percent of the mapped areas, the included soils make up 5 to 10 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 5 percent or more than 10 percent.

The available water capacity is very low to a depth of 48 inches and low below that depth. Permeability is very rapid to a depth of 48 inches and rapid below that depth. Natural fertility is low. The water table is at a depth below 80 inches.

This soil, in most areas, has been cleared and is used for citrus. The natural vegetation consists mainly of bluejack, post, and turkey oak, scattered longleaf and slash pine, and a sparse understory of indiangrass, chalky bluestem, pineland threeawn, panicum, and annual forbs.

This soil has low potential for cultivated crops because of poor soil quality. Intensive management practices are required if the soil is cultivated. Droughtiness and rapid leaching of plant nutrients reduce the kinds and potential yields of crops that can be grown. Close-growing crops should be kept on the soil at least three-fourths of the time. Cover crops and all crop residue are needed to help to control erosion. Only a few crops produce good yields without irrigation. Irrigation is usually feasible if water for irrigation is readily available.

This soil has medium potential for citrus trees. A ground cover of close-growing plants is needed between the trees to protect the soil from blowing. In some years good yields can be obtained without irrigation, but for best yields a well designed irrigation system is needed to maintain optimum moisture conditions.

The potential of this soil for improved pasture is low. Deep-rooting plants such as Coastal bermudagrass and bahiagrass are well adapted, but yields are reduced by periodic droughtiness. Regular applications of fertilizer and lime are needed. Controlled grazing is needed to permit plants to recover from grazing and to maintain plant vigor.

This soil has moderate potential productivity for pine trees, especially for sand and slash pine. The major management concerns because of the sandy texture of the soil are the establishment of seedlings and the movement of equipment.

If used as range, this soil has moderate potential for production of forage. The quantity and quality of the forage are poor.

This soil is in capability subclass IVs.

7—Basinger fine sand. This is a poorly drained, nearly level soil in poorly defined drainageways and sloughs in the flatwoods. Individual areas are irregular in shape and range from 5 to 25 acres. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is black and dark gray fine sand about 7 inches thick. The subsurface layer is light brownish gray fine sand to a depth of 14 inches. The next layer is dark brown fine sand mixed with grayish brown fine sand to a depth of 24 inches. The substratum is brown fine sand to a depth of 30 inches and light gray fine sand to a depth of 80 inches.

Included with this soil in mapping are similar soils that have a black surface layer 10 to 13 inches thick and that are in small depressions. Also included are small areas of Myakka, Ona, and Smyrna soils on higher positions near the edges of areas of this Basinger soil. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years, if this Basinger soil is not drained, the water table is at a depth of less than 10 inches for 2 to 6 months and at a depth of 10 to 30 inches for more than 6 months. Permeability is very rapid throughout. The available water capacity is very low, and natural fertility is low.

The natural vegetation is mainly longleaf and slash pine and an understory consisting of waxmyrtle, St. John's-wort, pineland threeawn, and sawpalmetto.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. The soil, however, has medium potential for some vegetable crops if a water control system can remove excess water during wet seasons and provide water by means of subsurface irrigation during dry seasons. Seedbed preparation should include bedding of the rows. Additions of fertilizer and lime should be based on the needs of the crops.

This soil is poorly suited to citrus trees. The potential for trees is low even if a carefully designed water control system can maintain the water table below a depth of

about 4 feet. The trees should be planted in beds, and a vegetative cover maintained between the trees.

This soil has high potential for improved pasture. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. A water control system that can remove excess surface water after heavy rains is needed. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderate potential productivity for longleaf pine and especially for slash pine if a water control system can remove excess surface water. The main management concerns are seedling mortality and restricted use of equipment during periods of heavy rainfall.

If used as range, this soil has high potential for producing blue maidencane, chalky bluestem, and various panicums. Carpetgrass, an introduced species, tends to become dominant if the site is overgrazed.

This soil is in capability subclass IVw.

8—Bradenton loamy fine sand, frequently flooded. This is a poorly drained, nearly level soil along streams and rivers and on low-lying ridges and hammocks in flood plains. Individual areas are long and narrow, generally are adjacent to streams, and range from 5 to 20 acres in size. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is very dark gray loamy fine sand about 4 inches thick. The subsurface layer is fine sand to a depth of about 15 inches. The upper 7 inches is gray, and the lower 8 inches is grayish brown. The subsoil is light gray sandy clay loam about 21 inches thick. The substratum is light brownish gray sandy loam to a depth of 66 inches and light gray loamy sand to a depth of 80 inches.

Included with this soil in mapping are small areas of similar soils that have limestone boulders below the subsoil. Also included are small areas of Felda, Pomona, and Wabasso soils. In 80 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 10 percent or more than 15 percent.

This Bradenton soil has a water table at a depth of less than 10 inches for 2 to 6 months each year. Generally, the soil is flooded every year and more than once in most years. Permeability is moderate. The available water capacity is low. Natural fertility is medium, and organic matter content is low.

This soil is used mainly as range and woodland. In some areas that have adequate water management, it is used for improved pasture and truck crops. The natural vegetation consists mainly of slash pine, laurel and live oak, cabbage palm, sawpalmetto, and pineland threeawn.

This soil is not suitable for cultivated crops or improved pasture because flooding is a severe hazard. If the hazard of flooding can be reduced, the potential is low for cultivated crops and medium for improved pasture.

This soil has high potential productivity for longleaf and slash pine. The management concerns are plant competition, seedling mortality, and use of heavy equipment. A water control system that reduces the hazard of flooding and that removes excess surface water should be installed before planting trees.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass Vw.

9—Popash mucky fine sand. This is a nearly level, very poorly drained soil in intermittent ponds. Slopes are smooth to concave and are less than 1 percent. Individual areas are circular and range from 3 to 15 acres in size.

Typically, the surface layer is black. The upper 10 inches is mucky fine sand, and the lower 11 inches is fine sand. The subsurface layer is gray fine sand to a depth of 52 inches. The subsoil is light brownish gray sandy loam to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Felda and Floridana soils and a few small areas of organic soils. In 80 percent of the mapped areas, the included soils make up 15 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either more or less than 15 percent.

In most years, most areas of this Popash soil are covered by standing water for 6 months or more. The available water capacity is moderate. Natural fertility is medium. Permeability is rapid in the surface layer and slow or very slow in the subsoil.

The natural vegetation consists mainly of waxmyrtle, pickerelweed, sedges, reeds, water-tolerant grasses, and a few cypress, bay, and tupelo trees.

Under natural conditions, the soil is not suitable for crops or improved pasture. The water table above the surface for much of the year severely restricts plant growth. In most places, however, an adequate water control system cannot be installed because suitable outlets are not available. If a system can be installed, the soil has medium potential for improved pasture.

This soil is not suitable for the commercial production of pine trees.

If used as range, this soil has very high potential for maidencane and cutgrass. The water level fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water level is high.

This soil is in capability subclass VIIw.

Figure 3.—Watermelons between strips of rye on Pomona fine sand, a soil that requires intensive management practices if it is used for cultivated crops.

10—Pomona fine sand. This is a nearly level, poorly drained soil in large areas on low ridges in the flatwoods. Slopes are smooth to concave and range from 0 to 2 percent. Individual areas are broad and oblong and range from 15 to 200 acres in size.

Typically, the surface layer is black fine sand about 3 inches thick. The subsurface layer is fine sand about 24 inches thick. The upper 7 inches is gray, and the lower 17 inches is light gray. The subsoil extends to a depth of 80 inches. The upper 8 inches is dark reddish brown fine sand coated with organic matter, the middle 22 inches is brown fine sand, and the lower 23 inches is gray fine sandy loam.

Included with this soil in mapping are small areas of Basinger, Myakka, Smyrna, and Wauchula soils. In 80 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 10 percent or more than 15 percent.

In most years this Pomona soil has a water table at a depth of 10 inches for 1 to 3 months and at a depth of less than 40 inches for more than 6 months.

The available water capacity is very low to low in all layers except the lower part of the subsoil, where it is moderate. Natural fertility is low. Permeability is moderate in the upper part of the subsoil, moderately slow in the lower part of the subsoil, and rapid in the other layers.

This soil is mainly in natural vegetation or is used for improved pasture. The natural vegetation includes longleaf and slash pine and sawpalmetto, gallberry, waxmyrtle, and pineland threeawn.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless intensive management practices are used, the kinds of crops that can be grown are limited (fig. 3). The soil has medium potential for some vegetable crops if a water control system can remove excess water during wet seasons and provide water for subsurface irrigation during dry seasons (fig. 4). Crop residue and cover crops are needed to protect the soil from erosion. Seedbed preparation should include bedding of the rows.

The potential of this soil for citrus trees is low even if a carefully designed water control system can maintain the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained

Figure 4.—Watermelons in contour beds on Pomona fine sand. The water control system in use is a combination of seepage irrigation and drainage ditches.

between the trees. Areas subject to freezing temperatures in winter are not suitable for citrus trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control is needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderately high potential productivity for pine trees, especially for slash pine, if a simple water control system can remove excess surface water. Management concerns are restricted use of equipment during periods of heavy rainfall, seedling mortality, and plant competition.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the site is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IVw.

11—Felda fine sand. This is a nearly level, poorly drained soil in low flat areas and in poorly defined drainageways. Individual areas are irregular in shape and range from 5 to 20 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is sand to a depth of about 31 inches. The upper 7 inches is light brownish gray, and the lower 20 inches is light gray. The subsoil is fine sandy loam about 27 inches thick. The upper 13 inches is light brownish gray, and the lower 14 inches is dark gray. The substratum is gray loamy sand to a depth of 80 inches.

Included with this soil in mapping are small areas of Bradenton, Holopaw, and Wabasso soils. In 90 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 10 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent.

If this Felda soil is not drained, the water table is within 10 inches of the surface for 2 to 6 months of the year. Permeability is moderate to moderately rapid. The available water capacity is low, and natural fertility is low.

This soil is used mainly as range and woodland. In some areas that have adequate water management, it is used for improved pasture and truck crops. The natural vegetation consists mainly of cabbage palm, longleaf and slash pine, water oak, waxmyrtle, sawpalmetto, pineland threeawn, and many grasses, vines, and shrubs.

The potential of this soil for cultivated crops is low because of wetness. Unless very intensive management

practices are used, the kinds of crops that can be grown are limited. The soil has medium potential for a number of vegetable crops if a water control system can remove excess water during wet seasons and provide water for subsurface irrigation during dry seasons.

This soil has medium potential for citrus trees if a water control system can maintain the water table below a depth of 4 feet.

The potential of this soil for improved pasture is high. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control is needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to maintain plant vigor.

This soil has moderately high potential productivity for longleaf and slash pine if a water control system can remove excess water from the soil.

If used as range, this soil has high potential for blue maidencane, chalky bluestem, and various panicums. Carpetgrass, an introduced species, tends to become dominant if the site is excessively grazed.

This soil is in capability subclass IIIw.

12—Felda fine sand, frequently flooded. This is a nearly level, poorly drained soil along the small streams and creeks throughout the county. The areas are mainly long and narrow and generally are adjacent to the streams. Individual areas range from 5 to 25 acres. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is black fine sand about 5 inches thick. The subsurface layer is fine sand to a depth of about 26 inches. The upper 5 inches is grayish brown, and the lower 16 inches is light gray. The subsoil is sandy loam about 22 inches thick. The upper 10 inches is gray, and the lower 12 inches is grayish brown. The substratum is light gray fine sand to a depth of 80 inches.

Included with this soil in mapping are small areas of Bradenton and Pompano soils. Also included are a few small areas of organic soils. In 80 percent of the mapped areas, the included soils make up about 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either more or less than 12 percent.

Generally, this soil is flooded every year. Every 2 years, on the average, it is flooded more than once during the year. The flooding results in yearly deposition on or scouring of the surface. In addition, there is debris on the surface. Floodwater marks are evident on trees, fences, and bridges. During periods when the soil is not flooded, the water table is within 10 inches of the surface for 2 to 6 months. Permeability is moderate to moderately rapid. The available water capacity is low, and natural fertility is low. The content of organic matter is low.

This soil is used mainly as woodland. The natural vegetation consists mainly of cypress, water oak, pond and slash pine, cabbage palm, and vines and shrubs.

This soil is not suitable for cultivated crops or improved pasture because flooding is a severe hazard. If the hazard of flooding can be reduced, the potential is low for cultivated crops and medium for improved pasture.

This soil has moderately high potential productivity for longleaf and slash pine. A water control system that can reduce the hazard of flooding and remove excess water is needed before trees can be planted.

If used as range, this soil has high potential for blue maidencane, chalky bluestem, and various panicums. Carpetgrass, an introduced species, tends to become dominant if the site is excessively grazed.

This soil is in capability subclass Vw.

13—Floridana mucky fine sand, depressional. This is a nearly level, very poorly drained soil in wet depressions. Individual areas are irregular in shape and range from 3 to 30 acres in size. Slopes are smooth to concave and are less than 2 percent.

Typically, the surface layer is about 15 inches thick. The upper 4 inches is black, mucky fine sand and the lower 11 inches is very dark gray fine sand. The subsurface layer is gray fine sand to a depth of 32 inches. The subsoil is dark gray sandy clay loam to a depth of 44 inches and gray sandy loam to a depth of 80 inches or more. It has lenses and pockets of loamy fine sand and fine sand.

Included with this soil in mapping are small areas of Felda and Popash soils and a few small areas of organic soils. In 80 percent of the mapped areas, the included soils make up 12 to 15 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 or more than 15 percent.

In most years, water stands on the surface of this Floridana soil for more than 6 months. The available water capacity is moderate, and natural fertility is medium. Permeability is rapid in the surface layer and slow or very slow in the subsoil.

The natural vegetation consists mainly of cypress, cattails, and dense stands of maidencane and sawgrass. Very few areas of this soil have been cleared, and most areas are ponded and do not have natural outlets.

Under natural conditions, this soil is not suitable for crops. The water table above the surface for most of the year severely restricts plant growth. In most places an adequate water control system cannot be installed because suitable outlets are not available. If a water control system can be installed, however, the potential of this soil for pasture is medium.

This soil is not suitable for the commercial production of pine trees.

If used as range, this soil has very high potential for production of maidencane and cutgrass. The water level

fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water level is high.

This soil is in capability subclass VIIw.

15—Immokalee fine sand. This is a poorly drained, nearly level soil on broad low ridges and low knolls in the flatwoods. Individual areas are irregular in shape and range from 10 to 60 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is gray fine sand to a depth of about 44 inches. The subsoil is fine sand to a depth of 80 inches. The upper 4 inches is black, and the lower 32 inches is dark reddish brown.

Included with this soil in mapping are small areas of Myakka, Ona, Placid, and Pomello soils. In 80 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 10 or more than 15 percent.

In most years, the water table is at a depth of less than 10 inches for 2 months and at a depth of 10 to 40 inches for more than 8 months. It is at a depth of more than 40 inches during dry periods. The available water capacity is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. Natural fertility is low.

In most areas this soil is used as range and woodland. In some areas that have adequate water management, it is used for citrus, improved pasture, and truck crops. The natural vegetation consists mainly of longleaf and slash pine and an undergrowth of sawpalmetto, gallberry, waxmyrtle, and pineland threeawn.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kind of crops that can be grown is limited. The soil has medium potential for vegetable crops if a water control system can remove excess water during wet seasons and provide water for subsurface irrigation during dry seasons. Good management practices include growing cover crops and leaving crop residue on the surface to help control erosion. Seedbed preparation should include bedding of the rows.

The potential of this soil for citrus trees is low even if a carefully designed water control system can maintain the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture grasses is medium. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. A water control system is needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderate potential productivity for pine trees, especially for slash pine, if a central water control system can remove excess surface water. Management concerns include restricted use of equipment during periods of heavy rainfall, seedling mortality, and plant competition.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IVw.

16—Myakka fine sand. This is a nearly level, poorly drained soil in broad areas in the flatwoods. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is very dark grayish brown fine sand about 6 inches thick. The subsurface layer is light gray fine sand to a depth of 21 inches. The subsoil is fine sand about 25 inches thick. The upper 4 inches is very dark gray, the next 5 inches is dark reddish brown, the next 10 inches is dark brown, and the lower 6 inches is brown. The substratum is pale brown and light brownish gray fine sand to a depth of 80 inches.

Included with this soil in mapping are areas of similar soils that have a black surface layer more than 8 inches thick. Also included are small areas of Adamsville, Basinger, Pomona, Smyrna, and Pompano soils. In 85 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 15 percent of the mapped areas, the included soils make up either less than 10 percent or more than 15 percent.

In most years this Myakka soil has a water table at a depth of less than 10 inches for 1 to 4 months. The water table recedes to a depth of more than 40 inches during very dry seasons. The available water capacity is moderate in the subsoil but is very low in the other layers. Permeability is rapid in the surface layer and substratum and moderate or moderately rapid in the subsoil. Internal drainage is slow, and runoff is slow. Natural fertility is low.

This soil is mainly wooded. The natural vegetation includes longleaf and slash pine and an understory of sawpalmetto, running oak, gallberry, waxmyrtle, huckleberry, pineland threeawn, and scattered fetter bushes.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. The soil has medium potential for vegetable crops if a water control system can remove excess water during wet seasons and provide water for subsurface irrigation during dry seasons. Crop residue and cover crops are needed to help control erosion. Seedbed preparation should include bedding of the rows.

The potential of this soil for citrus trees is low even if a carefully designed water control system can maintain the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has low potential productivity for pine trees. A central water control system to remove excess surface water is needed for increased production. Slash pine is better suited than other trees. Management concerns are restricted use of equipment during periods of heavy rainfall, seedling mortality, and plant competition.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IVw.

17—Smyrna sand. This is a nearly level, poorly drained soil in the flatwoods. Individual areas are irregular in shape and range from 3 to 20 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is very dark gray sand about 5 inches thick. The subsurface layer is light gray sand to a depth of 16 inches. The subsoil is organic-coated sand to a depth of 29 inches. The upper part is black, and the lower part is dark reddish brown and dark brown. Below the subsoil there is a light gray sand to a depth of 48 inches and dark brown sand to a depth of 80 inches or more.

Included with this soil in mapping are Immokalee, Myakka, and Ona soils. In 80 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent.

In most years this Smyrna soil has a water table at a depth of less than 10 inches for 1 to 4 months and at a depth of 10 to 40 inches for more than 6 months. Permeability is moderate. Natural fertility is moderate. The available water capacity is moderate in the subsoil and very low to low in the other layers.

This soil is used mainly for improved pasture and citrus where bedding is used or surface drainage has been installed, or both. The native vegetation includes longleaf and slash pine and an undergrowth of sawpalmetto, running oak, gallberry, waxmyrtle, and pineland threeawn.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. The soil has medium potential for some vegetable crops if a water control system can remove excess water during wet seasons and provide water for subsurface irrigation during dry seasons. Crop residue and soil-improving crops should be plowed under. Seedbed preparation should include bedding of the rows (fig. 5).

The potential of this soil for citrus trees is low even if a carefully designed water control system has been installed to maintain the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderately high potential productivity for pine trees, especially for slash pine. Management concerns are restricted use of equipment during periods of heavy rainfall, seedling mortality, and plant competition. For highest yields, a central water control system is needed to remove excess surface water.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs (fig. 6). If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IVw.

18—Cassia fine sand. This is a nearly level, somewhat poorly drained soil on low ridges slightly higher than the adjacent flatwoods. Individual areas are irregular in shape and range from 5 to 15 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is white sand to a depth of 27 inches. The subsoil is sand to a depth of 65 inches. In the upper 7 inches it is dark reddish brown, and the grains are coated with organic material; in the next 23 inches it is brown or pale brown, and in the lower 8 inches it is dark grayish brown and contains black very firm fragments. The substratum to a depth of 80 inches or more is very pale brown and light gray sand.

Included with this soil in mapping are small areas of Immokalee and Pomello soils. In 90 percent of the mapped areas, the included soils make up 5 to 12 percent of the acreage. In 10 percent of the mapped areas, the included soils make up either less than 5 or more than 12 percent.

Figure 5.—Strawberries planted in beds. The soil is Smyrna sand.

This Cassia soil has a water table at a depth of 15 to 40 inches for about 6 months and at a depth below 40 inches during dry periods. The available water capacity is very low to low except in the subsoil, where it is moderate. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate to moderately rapid in the subsoil.

This soil is used mainly as range. The natural vegetation consists of scattered slash and longleaf pine, dwarf and sand live oak, sawpalmetto, pineland threeawn, running oak, and broomsedge bluestem.

This soil has low potential for cultivated crops because of droughtiness and rapid leaching of plant nutrients. It is not suitable for most commonly cultivated crops.

The potential of this soil for citrus trees is medium. In some years, good yields can be obtained without irrigation, but for best yields, irrigation should be used if water is available.

The potential of this soil for improved pasture is low even if good management practices are used. Grasses such as bahiagrass are better adapted than others. Clovers are not suited. Yields are reduced by periodic droughts. Regular applications of fertilizer and lime are needed. Grazing should be greatly restricted to permit plants to maintain vigorous growth for highest yields and to provide ground cover.

The potential productivity of this soil is low for pine trees. Sand pine is better suited than other trees. Major management concerns include seedling mortality, mobility of equipment, and plant competition.

If used as range, this soil has low potential for native forage.

This soil is in capability subclass VIs.

19—Ona fine sand. This is a poorly drained, nearly level soil in the flatwoods. Individual areas are irregular in shape and range from 3 to 100 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 9 inches thick. The subsoil is dark reddish brown loamy fine sand to a depth of 16 inches. The substratum is fine sand to a depth of 80 inches or more. The upper 8 inches is brown, the next 18 inches is pale brown, the next 18 inches is light gray, and the lower 20 inches is brown.

Included with this soil in mapping are small areas of Basinger, Immokalee, Myakka, and Placid soils. Also included are wet spots and small ponds. In 80 percent of

the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years this Ona soil has a water table at a depth of 10 to 40 inches for 4 to 6 months. The water table rises to a depth of less than 10 inches for 1 to 2 months and may recede to a depth of more than 40 inches during very dry seasons. Permeability is moderate. Natural fertility is moderate. The available water capacity is moderate in the surface layer and subsoil and very low to low in the other layers.

This soil is used mainly for improved pasture and truck crops. In some areas where bedding is used and surface drainage has been installed, it is used for citrus. The natural vegetation includes slash and longleaf pine, gallberry, and widely spaced sawpalmetto, huckleberry, and pineland threeawn.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. The soil has medium potential for some vegetable crops if a water control system can remove excess water during wet seasons and provide water for subsurface irrigation during dry seasons. Crop residue and cover crops are needed to control erosion.

The potential of this soil for citrus trees is low even if a carefully designed water control system can maintain the water table at a depth below 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderately high potential productivity for pine trees, especially for slash pine. Management concerns are restricted use of equipment during periods of heavy rainfall, seedling mortality, and plant competition. For highest yields, a central water control system is needed to remove excess surface water.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IIIw.

20—Samsula muck. This is a very poorly drained, nearly level organic soil in low depressions. Individual areas are irregular in shape and range from 3 to 100 acres in size. Slopes are less than 2 percent.

Figure 6.—Native range on Smyrna sand in the South Florida Flatwoods range site.

Typically, the surface layer is black muck about 25 inches thick. Below the muck there is fine sand to a depth of 65 inches or more. In the upper 8 inches the fine sand is black. In the lower 32 inches it is light gray.

Included with this soil in mapping are areas of similar soils except that the organic material is less than 16 inches thick. Also included are small areas of soils that have organic material to a depth of 52 inches or more. Also included are areas of soils that are loamy within a depth of 52 inches. In 80 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent.

This Samsula soil has a water table at or near the surface for 6 to 12 months of the year. If the soil is not drained, it is covered by water for very long periods. The available water capacity is very high in the organic layer and very low in the sandy layers. Permeability is rapid throughout. Natural fertility is moderate, and the content of organic matter is very high.

The native vegetation consists of loblolly bay, scattered cypress, maple, gum, and pine, and a ground cover of greenbrier, ferns, and other aquatic plants.

This soil is mainly in native vegetation and is used as range. In a few areas that have been cleared, the soil is used for improved pasture and truck crops.

This soil is not suitable for cultivated crops. However, it has high potential for some crops if a well designed and maintained water control system can remove excess water when the soil is in crops and can keep the soil saturated at other times. Fertilizers that contain phosphates, potassium, and minor elements are needed. Heavy applications of lime are needed.

This soil has high potential for improved pasture grasses and clover if a water control system can maintain the water table near the surface to prevent excessive oxidation of the organic layer. Fertilizers high in potassium, phosphates, and minor elements are needed. Grazing should be controlled for maximum yields.

If used as range, this soil has very high potential for production of maidencane and cutgrass. The water level fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water level is high.

This soil is not suitable for citrus trees or the commercial production of pine trees.

This soil is in capability subclass IVw.

21—Placid fine sand, depressional. This is a very poorly drained soil in wet depressions and in poorly defined drainageways in the flatwoods. Individual areas are irregular in shape and range from 3 to 20 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is fine sand about 18 inches thick. It is black in the upper 6 inches and very dark gray in the lower 12 inches. The underlying material is grayish brown or light brownish gray fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Basinger and Pompano soils. Also included are small areas of similar soils that have a well decomposed organic surface layer 3 to 12 inches thick. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years this Placid soil is covered by water for 6 months or more. The available water capacity is high in the surface layer and low in the underlying material. Permeability is rapid throughout. Internal drainage is slow because it is impeded by a shallow water table. Natural fertility and the content of organic matter are high to a depth of about 15 inches and low below that depth.

This soil, in most places, is in native vegetation and is used as range or wildlife habitat. In some areas that have been cleared and that have water control measures, the soil is used for truck crops, improved pasture, and citrus. The natural vegetation consists mainly of pond pine, bay, cypress, gum, pickerelweed, rushes, sedges, maidencane, and other water-tolerant grasses.

Under natural conditions, this soil is not suitable for crops. The water table above the surface for most of the year severely restricts plant growth. In most places an adequate water control system cannot be installed because suitable outlets are not available. If a water control system can be installed, the potential for good quality pasture is medium.

This soil is not suitable for the commercial production of pine trees.

If used as range, this soil has very high potential for maidencane and cutgrass. The water level fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water level is high.

This soil is in capability subclass VIIw.

22—Pomello fine sand. This is a nearly level, moderately well drained soil on low ridges in the flatwoods. Individual areas are irregular in shape and range from 10 to 60 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is gray fine sand about 5 inches thick. The subsurface layer is fine sand about 41 inches thick. The upper 10 inches is gray, and the lower 31 inches is white. The subsoil is black fine sand to a depth of 58 inches. Below that, there is gray fine sand 8 inches thick and black fine sand 14 inches thick.

Included with this soil in mapping are small areas of Cassia, Electra, and Jonathan soils in about the same position on the landscape as this Pomello soil. In 80 percent of the mapped areas, the included soils make up

12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years this Pomello soil has a water table at a depth of 24 to 40 inches for 1 to 4 months and at a depth of 40 to 60 inches for 8 months. The available water capacity is very low except in the subsoil, where it is moderate. Natural fertility is low. Permeability is very rapid in the surface layer and moderately rapid in the subsoil.

The natural vegetation includes dwarf and sand live oak, sawpalmetto, longleaf and slash pine, pineland threeawn, and running oak.

This soil has low potential for cultivated crops because of droughtiness and rapid leaching of plant nutrients. It is not suitable for most commonly cultivated crops.

The potential of this soil for citrus trees is medium. In some years, good yields can be obtained without irrigation, but for highest yields, irrigation should be used if water is available.

The potential of this soil for improved pasture is low even if good management practices are used. Grasses such as bahiagrass are better adapted than others. Clovers are not suited. Yields are reduced by periodic droughts. Regular applications of fertilizer and lime are needed. Grazing should be greatly restricted to permit plants to maintain vigorous growth for highest yields and to provide good ground cover.

This soil has moderate potential productivity for pine trees. Sand pine is better suited than other trees. Management concerns are seedling mortality, mobility of equipment, and plant competition.

If used as range, this soil has low potential for native forage.

This soil is in capability subclass VIs.

23—Sparr fine sand. This is a nearly level, somewhat poorly drained soil in seasonally wet, sandy areas on uplands. Slopes are smooth. Individual areas are irregular in shape and range from 10 to 40 acres in size.

Typically, the surface layer is dark grayish brown fine sand about 6 inches thick. The subsurface layer is yellowish brown to very pale brown fine sand to a depth of 60 inches. The subsoil to a depth of 80 inches or more is light gray sandy clay loam that has yellow mottles.

Included with this soil in mapping are Apopka, Candler, and Tavares soils. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years this Sparr soil has a perched water table on loamy material for 1 to 4 months. The available water capacity is low in the surface and subsurface layers and moderate to high in the subsoil. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil.

In many areas the soil is used for citrus and pasture and as range. Natural vegetation includes oak, hickory, magnolia, sweetgum, slash and longleaf pine, and in some areas an understory of gallberry. waxmyrtle, scattered sawpalmetto, and pineland threeawn.

The potential of this soil for most cultivated crops is low mainly because of droughtiness or poor soil quality. However, good yields of fruit and vegetable crops can be obtained if the crops are irrigated during dry periods. Row crops should be grown in sequence with close-growing cover crops. The cover crops should be on the land three-fourths of the time. Crop residue and cover crops are needed to control erosion. Seedbed preparation should include bedding of the rows. Additions of fertilizer and lime should be based on the needs of the crop.

This soil has very high potential for citrus trees. A water control system is needed to maintain the water table below a depth of about 4 feet. Close-growing vegetation should be maintained between the trees to protect the soil from blowing in dry weather and from washing during heavy rains. Regular applications of fertilizer and lime are needed.

The potential of this soil for improved pasture is high. Pangolagrass, bahiagrass, and white clover grow well if they are well managed. In some areas a simple water control system is needed for best yields. Regular applications of fertilizer and lime are needed, and grazing should be controlled to maintain vigor of the plants.

This soil has moderately high potential productivity for longleaf pine and especially for slash pine. Management concerns are mobility of equipment, seedling mortality, and plant competition.

If used as range, this soil has moderate potential for forage. Indiangrass generally is the most important forage species. The tree canopy can become so dense that the quality and quantity of forage are drastically reduced.

This soil is in capability subclass IIIs.

24—Jonathan sand. This is a moderately well drained to somewhat excessively drained soil on low ridges in the flatwoods. Individual areas are irregular in shape, and most range from 5 to 60 acres in size. Slopes are smooth and are less than 2 percent.

Typically, the surface layer is very dark gray sand about 6 inches thick. The subsurface layer is gray to white sand and fine sand to a depth of 64 inches. The subsoil is loamy fine sand coated with organic material. The upper 5 inches is dark reddish brown, and the lower 11 inches is black.

Included with this soil in mapping are small areas of Cassia and Pomello soils. In 90 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 10 percent of the mapped areas, the

included soils make up either less than 8 percent or more than 12 percent.

The water table is at a depth of 40 to 60 inches for 1 to 4 months or at a depth of 36 inches for brief periods. It is at a depth of more than 60 inches for the rest of the year. Permeability is rapid in the surface and subsurface layers and slow or very slow in the subsoil. The available water capacity is very low.

The natural vegetation consists mainly of dwarf and scrub oak, sawpalmetto, sand pine, pricklypear, and pineland threeawn.

This soil has low potential for cultivated crops because of droughtiness and rapid leaching of plant nutrients. It is not suitable for most commonly cultivated crops.

The potential of this soil for citrus trees is medium. In some years, good yields can be obtained without irrigation, but for best yields, irrigation should be used if water is available.

The potential of this soil for improved pasture is low even if good management practices are used. Grasses such as bahiagrass are better adapted than others. Clovers are not suited. Yields are reduced by periodic droughts. Regular applications of fertilizer and lime are needed. Grazing should be greatly restricted to permit plants to maintain vigorous growth for highest yields and to provide good ground cover.

This soil has low potential productivity for pine trees. Sand pine is better suited than other trees. Major management concerns are seedling mortality, mobility of equipment, and plant competition.

If used as range, this soil has low potential for native forage.

This soil is in capability subclass VIs.

25—Wabasso fine sand. This is a nearly level, poorly drained soil in broad areas in the flatwoods. Individual areas are irregular in shape and range from 10 to 60 acres in size. Slopes are less than 2 percent.

Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer is fine sand 20 inches thick. The upper 14 inches is gray, and the lower 6 inches is light brownish gray. The subsoil extends to a depth of 70 inches. It is very dark grayish brown fine sand coated with organic material to a depth of about 32 inches and light brownish gray sandy loam to a depth of 52 inches. Below that, it is gray sandy loam to a depth of 64 inches and light olive gray sandy loam to a depth of 70 inches. The substratum is olive gray loamy sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Felda and Pomona soils. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years, the water table is at a depth of 10 to 40 inches for more than 6 months. It is at a depth of less than 10 inches for less than 60 days during wet seasons and at a depth of more than 40 inches during very dry seasons. The available water capacity is low. Permeability is rapid in the surface and subsurface layers, moderate in the upper part of the subsoil, and slow in the lower part of the subsoil. Natural fertility is low.

The natural vegetation includes longleaf and slash pine, and scattered cabbage palm, and an understory of sawpalmetto, inkberry, waxmyrtle, creeping bluestem, indiangrass, little bluestem, Florida paspalum, pineland threeawn, panicums, deertongue, grassleaf goldaster, huckleberry, and running oak.

Wetness and poor soil quality are severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. The soil has medium potential for some vegetable crops if a water control system can remove excess water during wet seasons and provide water for subsurface irrigation during dry seasons. Crop residue and cover crops are needed to help control erosion. Seedbed preparation should include bedding of the rows.

The potential of this soil for citrus trees is low even if a carefully designed water control system can maintain the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if they are well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

This soil has moderately high potential productivity for pine trees, especially for slash pine. For highest yields, a simple water control system is needed to remove excess surface water. Management concerns are equipment limitations during periods of heavy rainfall, seedling mortality, and plant competition.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IIIw.

26—Electra sand. This is a nearly level to gently sloping, somewhat poorly drained soil on ridges on uplands. Individual areas are irregular in shape and range from 10 to 40 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is gray sand about 4 inches thick. The subsurface layer is sand to a depth of about 42 inches. The upper 12 inches is light gray, and the lower 26 inches is white. The subsoil extends to a depth

of 80 inches. It is dark reddish brown sand to a depth of 54 inches and is dark brown sand to a depth of 60 inches. Next, it is gray and dark brown sand to a depth of 66 inches, light brownish gray fine sandy loam to a depth of 72 inches, and light gray fine sandy loam to a depth of 80 inches.

Included with this soil in mapping are small areas of Cassia and Pomello soils and many areas of Electra soils that have short slopes of more than 3 percent. The included soils make up about 10 percent of a mapped area.

In most years this Electra soil has a water table at a depth of 20 to 40 inches for 4 months. The water table recedes to a depth of more than 40 inches during drier periods. The available water capacity is low. Permeability is rapid in the surface and subsurface layers, moderate in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil. Natural fertility is low.

The natural vegetation consists mainly of sand live oak, scattered longleaf, slash, and sand pine, and an understory of pineland threeawn, sawpalmetto, running oak, blueberry, creeping bluestem, chalky bluestem, indiangrass, low panicums, and numerous forbs.

This soil has low potential for cultivated crops because of droughtiness and rapid leaching of plant nutrients. It is not suitable for most commonly cultivated crops.

The potential of this soil for citrus trees is medium. In some years good yields can be obtained without irrigation, but for best yields, irrigation should be used if water is available.

The potential for improved pasture is low even if good management practices are used. Grasses such as bahiagrass are better adapted than others. Clovers are not suited. Yields are reduced by periodic droughts. Regular applications of fertilizer and lime are needed.

Grazing should be greatly restricted to permit plants to maintain vigorous growth for highest yields and to provide ground cover.

This soil has moderate potential productivity for pine trees. Sand pine is the best tree to plant. The major management concerns are seedling mortality, mobility of equipment, and plant competition.

If used as range, this soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass VIs.

27—Bradenton-Felda-Chobee association, frequently flooded. This association consists of poorly drained Bradenton and Felda soils and very poorly drained Chobee soils. The Bradenton soils make up about 35 percent of the association, Felda soils make up 25 percent, Chobee soils make up 20 percent, and minor soils make up 20 percent. The soils are in regular and repeating patterns along streams and rivers throughout the county. Most areas are long and narrow and are adjacent to the Peace River. Felda and Bradenton soils are in the higher places, and Chobee soils are in the lower places. The individual areas of each soil range from 5 to 120 acres. Slopes are 0 to 2 percent. The soils are subject to frequent flooding.

Bradenton soils have a surface layer of dark gray loamy fine sand about 6 inches thick. The subsurface layer is grayish brown fine sand about 10 inches thick. The subsoil is light brownish gray sandy clay loam about 13 inches thick. The substratum is gray sandy clay loam to a depth of 80 inches.

Bradenton soils have a water table at a depth of less than 10 inches for 1 to 4 months of the year, and at a depth of 10 to 40 inches for more than 8 months. Permeability is moderate. The available water capacity is low. Natural fertility is medium, and the content of organic matter is low.

Felda soils have a surface layer of black fine sand about 5 inches thick. The subsurface layer is fine sand about 21 inches thick. In the upper 5 inches it is grayish brown, and in the lower 16 inches it is light gray. The subsoil is sandy loam about 22 inches thick. In the upper 10 inches it is gray, and in the lower 12 inches it is grayish brown. The substratum is light gray fine sand to a depth of 80 inches.

Felda soils have a water table within 10 inches of the surface for 2 to 6 months of the year. Permeability is moderate to moderately rapid. The available water capacity is low. Natural fertility is low, and the content of organic matter is low.

Chobee soils have a surface layer of black fine sandy loam about 8 inches thick. The subsoil is sandy clay loam about 47 inches thick. It is black in the upper 10 inches and very dark gray in the lower 37 inches. The substratum is gray loamy fine sand to a depth of 80 inches.

Chobee soils have a water table at a depth of less than 10 inches for 6 or more months of the year..The water table seldom recedes to a depth of more than 20 inches. Permeability is slow or very slow. The available water capacity is moderate. Natural fertility is high, and the content of organic matter is high.

The minor soils that were included in mapping are Holopaw, Manatee, and Pompano soils and small areas of organic soils. In 25 percent of the mapped areas or less, the minor soils make up either less than 20 percent or more than 20 percent of the acreage.

The soils making up this association are mainly in dense vegetation consisting of water oak, cypress, sweetgum, hickory, cutgrass, maidencane, sawgrass, swamp primrose, buttonbush, smartweed, sedges, and other water-tolerant plants.

These soils are not suitable for cultivated crops or improved pasture mainly because flooding is a severe hazard. If the hazard of flooding can be reduced, the

potential is low for cultivated crops and medium for improved pasture grasses.

Bradenton and Chobee soils have high potential productivity for pine, and Felda soils have moderately high potential productivity. A water control system that reduces the hazard of flooding and removes excess surface water is needed before trees can be planted.

If used as range, these soils have moderate potential for forage because of the dense canopy of palm trees. The trees provide shade and rest areas for cattle.

These soils are in capability subclass Vw.

28—Holopaw fine sand. This is a poorly drained, nearly level soil on broad, low-lying flats and in poorly defined drainageways. Individual areas are irregular in shape and range from 5 to 40 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 3 inches thick. The subsurface layer is fine sand to a depth of 63 inches. The upper 5 inches is light gray, the middle 16 inches is brown, and the lower 39 inches is light gray. The subsoil is gray sandy loam to a depth of 80 inches.

Included with this soil in mapping are small areas of Felda and Pomona soils. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

This Holopaw soil has a water table within 10 inches of the surface for 2 to 6 months of the year. Permeability is rapid in the surface and subsurface layers and moderate to moderately slow in the subsoil. The available water capacity is low. Natural fertility is low to medium.

The soil is used mainly as range and woodland. In some areas that have adequate water management, it is used for truck crops. The natural vegetation is mainly scattered slash pine and cabbage palm and sawpalmetto.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. The soil has medium potential for some vegetable crops if a water control system can remove excess water in wet seasons and provide water for subsurface irrigation in dry seasons. Crop residue and soil-improving crops should be used to protect the soil from erosion. Seedbed preparation should include bedding of the rows.

The potential of this soil for citrus trees is low even if a carefully designed water control system maintains the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

The soil is used mainly as range and woodland. In some areas that have adequate water management, it is used for truck crops. The natural vegetation is scattered slash pine and cabbage palm and sawpalmetto.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. The soil has medium potential for some vegetable crops if a water control system can remove excess water in wet seasons and provide water for subsurface irrigation in dry seasons. Crop residue and cover crops should be used to protect the soil from erosion. Seedbed preparation should include bedding of the rows.

The potential of this soil for citrus trees is low even if a carefully designed water control system maintains the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

The soil has moderately high potential productivity for pine trees, especially for slash pine. The main management concerns are equipment use during periods of heavy rainfall, seedling mortality, and plant competition. For highest yields, a simple water control system is needed to remove excess surface water.

If used as range, the soil has high potential for blue maidencane, chalky bluestem, and various panicums. Carpetgrass, an introduced species, tends to become dominant if the site is excessively grazed.

This soil is in capability subclass IVw.

29—Pits. Pits, or borrow pits, are open excavations from which soil and geologic material have been removed primarily for use in road construction or for foundations. Waste material, mostly a mixture of sand, sandy loam, and sandy clay loam, is piled or scattered around the edges of the pits. Most of the pits are small; a few are large. Many have been abandoned. The areas are not suited to cultivated crops or to pine trees.

This map unit is not assigned to a capability subclass.

30—Hontoon muck. This is a very poorly drained, nearly level soil in swamps and in poorly defined drainageways. Most areas are circular to oblong and

range from about 15 to 100 acres in size. Slopes are concave and range from 0 to 2 percent.

Typically, the surface layer is black to dark reddish brown muck to a depth of 60 inches. Below the muck there is dark gray loamy fine sand to a depth of 70 inches and dark gray fine sandy loam to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Placid, Samsula, and Kaliga soils. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

This Hontoon soil has a water table at or above the surface except during extended dry periods. Permeability is rapid. The available water capacity is very high. The natural fertility is high. The content of organic matter is high.

The soil, in most areas, is in native vegetation and is used for water storage for irrigation and as wildlife habitat. A small acreage that has water control is used for truck crops and pasture. In dry weather, fire is a severe hazard on this soil. The natural vegetation consists mainly of loblollybay, maple, gum, and scattered cypress trees and a ground cover of greenbrier, ferns, and other aquatic plants. In a few areas the natural vegetation is slash pine and a ground cover of osmunda fern.

The soil is not suitable for cultivation. If a water control system is installed, the soil has high potential for some specialized crops and for improved pasture.

The soil is not suitable for citrus trees.

Generally, drainage is not practical for production of pine trees on this soil.

The potential of this soil for use as habitat for wetland and woodland wildlife is high. The shallow water areas are easily developed, and food and cover are abundant.

If used as range, the soil has very high potential for maidencane and cutgrass. The water level fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water level is high.

This soil is in capability subclass IIIw.

31—Pompano fine sand, frequently flooded. This is a poorly drained, deep sandy soil on flood plains and in well defined drainageways throughout the county. Individual areas are long and narrow, are adjacent to the stream, and range from 5 to 15 acres in size. Slopes generally are less than 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The substratum is light gray fine sand to a depth of 44 inches and is light brownish gray fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Adamsville, Basinger, and Placid soils. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years, the water table is at a depth of less than 10 inches for 2 to 6 months. Generally, the soil is flooded every year and more than once in most years.

The available water capacity is very low. Natural fertility is low. Permeability is very rapid.

The soil is used mainly as range and woodland. In some areas that have been cleared, it is used for improved pasture and truck crops. The natural vegetation consists mainly of slash pine, cypress, cabbage palm, oak, magnolia, and hickory and an understory of creeping bluestem, lopsided indiangrass, blue maidencane, Florida paspalum, pineland threeawn, low panicums, grassleaf goldaster, gallberry, and sawpalmetto.

The soil is not suitable for cultivated crops or improved pasture because flooding is a severe hazard. Even if the hazard of flooding is reduced, the potential is low for cultivated crops and medium for improved pasture.

The soil is not suitable for the commercial production of pine trees.

If used as range, the soil has high potential for blue maidencane, chalky bluestem, and various panicums. Carpetgrass, an introduced species, tends to become dominant if the site is excessively grazed.

This soil is in capability subclass VIw.

32—Felda fine sand, depressional. This is a nearly level, poorly drained soil in depressions. Individual areas are irregular in shape and range from 10 to 60 acres in size. Slopes are smooth to concave and are less than 2 percent.

Typically, the surface layer is black fine sand about 5 inches thick. The subsurface layer is fine sand to a depth of about 26 inches. The upper 5 inches is grayish brown, and the lower 16 inches is light gray. The subsoil is sandy loam about 22 inches thick. The upper 10 inches is gray, and the lower 12 inches is grayish brown. The substratum is light gray fine sand to a depth of 80 inches.

Included with this soil in mapping are small areas of Bradenton and Holopaw soils and a few small areas of organic soils. In 85 percent of the mapped areas, the included soils make up about 8 percent of the acreage. In 15 percent of the mapped areas, the included soils make up either more or less than 8 percent.

In most years, water stands on this soil for more than 6 months. The available water capacity is low, and natural fertility is medium. Permeability is moderate to moderately rapid.

The soil is used mainly as range. The natural vegetation consists mainly of cypress, cattails, cabbage palm, maidencane, and sawgrass.

Under natural conditions, the soil is not suitable for crops or improved pasture. The water table above the

surface for much of the year severely restricts plant growth. In most places an adequate water control system cannot be installed because suitable outlets are not available. If a system can be installed, the potential is medium for improved pasture.

The soil is not suitable for the commercial production of pine trees.

If used as range, the soil has very high potential for maidencane and cutgrass. The water level fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water table is high.

This soil is in capability subclass VIIw.

33—Manatee mucky fine sand, depressional. This is a very poorly drained, nearly level soil in depressions. Individual areas are irregular in shape and range from 10 to 300 acres in size. Slopes are smooth to concave and are less than 2 percent.

Typically, the surface layer is about 14 inches thick. The upper 4 inches is black mucky fine sand, the next 5 inches is black fine sand, and the lower 5 inches is very dark grayish brown fine sand. The subsoil extends to a depth of 44 inches. The upper 16 inches is dark gray sandy loam, and the lower 14 inches is grayish brown sandy loam. The subsoil has lenses and pockets of fine sand. The substratum is light brownish gray sandy loam to a depth of 64 inches and light gray sandy clay loam to a depth of 80 inches.

Included with this soil in mapping are small areas of Felda, Bradenton, Kaliga, and Floridana soils. In 90 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 10 percent of the mapped areas, the included soils make up either less than 10 percent or more than 15 percent.

In most years water stands on this Manatee soil for more than 6 months. Permeability is moderate. The available water capacity is moderate, and natural fertility is medium. The content of organic matter is high.

The soil, in most areas, is mainly in native vegetation. In a few areas that have been drained, it is used for improved pasture. The natural vegetation includes cypress, myrtle, greenbrier, and some red maple. In treeless areas, the natural vegetation is mainly pickerelweed, lilies, sedges, and some sawgrass.

If this soil is not drained, it is not suitable for crops or improved pasture. The water table, which is above the surface for much of the year, severely restricts plant growth. In most places an adequate water control system cannot be installed because suitable outlets are not available. If a system can be installed, the soil has medium potential for production of improved pasture.

The soil is not suitable for the commercial production of pine trees.

If used as range, the soil has very high potential for maidencane and cutgrass. The water level fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water level is high.

This soil is in capability subclass VIIw.

34—Wauchula fine sand. This is a nearly level, poorly drained soil in broad, low areas in the flatwoods. Individual areas are irregular in shape and range from 10 to 40 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is gray or light gray fine sand to a depth of 22 inches. The subsoil extends to a depth of 80 inches. The upper 12 inches is dark reddish brown fine sand, the next 4 inches is yellowish brown fine sand, the next 12 inches is grayish brown sandy clay loam, and the lower 30 inches is greenish gray loamy fine sand.

Included with this soil in mapping are areas of similar soils that have slopes of more than 2 percent. In most places these areas are at the outer edges of the mapped areas. Also included are small areas of Farmton, Felda, Myakka, and Pomona soils. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years, if this Wauchula soil is not drained, the water table is at a depth of less than 10 inches for 1 to 4 months and is at a depth of 10 to 40 inches for the rest of the year. In very dry periods the water table recedes to a depth of more than 40 inches. The available water capacity is moderate. Permeability is rapid in the surface and subsurface layers and moderate to rapid below that, except in the loamy part of the subsoil, where it is slow. Natural fertility is low.

The natural vegetation includes longleaf and slash pine and an understory of sawpalmetto, gallberry, waxmyrtle, creeping bluestem, indiangrass, little bluestem, Florida paspalum, pineland threeawn, huckleberry, and running oak.

Wetness and poor soil quality are severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. A water control system is needed to remove excess water in wet seasons and to provide water for subsurface irrigation in dry seasons. Crop residue and cover crops should be used to protect the soil from erosion. Seedbed preparation should include bedding of the rows.

The potential of this soil for citrus trees is low even if a carefully designed water control system can maintain the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if well managed. Water control

measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

The soil has moderately high potential productivity for pine trees, especially for slash pine. Management concerns are restricted use of equipment during periods of heavy rainfall, seedling mortality, and plant competition. For highest yields, a simple water control system is needed to remove excess surface water.

If used as range, the soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IIIw.

35—Farmton fine sand. This is a poorly drained soil in nearly level flatwoods. Slopes are smooth and range from 0 to 2 percent. Individual areas are irregular in shape and range from about 20 to 200 acres in size.

Typically, the surface layer is black fine sand about 6 inches thick. The subsurface layer is fine sand to a depth of about 34 inches. The upper 6 inches is dark gray; the middle 7 inches is light gray; and the lower 15 inches is white. The subsoil extends to a depth of 80 inches. It is very dark brown fine sand in the upper 11 inches, brown fine sand in the next 10 inches, black fine sand in the next 6 inches, dark gray fine sandy loam in the next 10 inches, and mottled gray, olive, and greenish gray sandy clay loam in the lower 9 inches.

Included with this soil in mapping are areas of Immokalee, Myakka, Pomona, and Wauchula soils. In 80 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent.

In most years, if this Farmton soil is not drained, the water table is at a depth of 10 to 40 inches for periods of more than 6 months. It is at a depth of less than 10 inches for 1 to 3 months in wet seasons, and recedes to a depth of more than 40 inches in extended dry periods. Permeability is rapid in the surface and subsurface layers, moderate in the sandy part of the subsoil, and slow to very slow in the loamy part of the subsoil. The available water capacity is low. The content of organic matter is low, and natural fertility is low.

The soil is used mainly as range and woodland. In some areas that have been cleared, it is used for improved pasture. The native vegetation includes cabbage palm, sawpalmetto, live oak, and slash pine and an undergrowth of laurel, waxmyrtle, and pineland threeawn.

Wetness and poor soil quality are very severe limitations to use of this soil for cultivated crops. Unless very intensive management practices are used, the kinds of crops that can be grown are limited. The soil has medium potential for some vegetable crops. A water control system is needed to remove excess water in wet seasons and to provide water for subsurface irrigation in dry seasons. Crop residue and cover crops should be used to protect the soil from erosion. Seedbed preparation should include bedding of the rows.

The potential of this soil for citrus trees is low even if a carefully designed water control system can maintain the water table below a depth of 4 feet. The trees should be planted in beds and a vegetative cover maintained between the trees.

The potential of this soil for improved pasture is medium. Pangolagrass, improved bahiagrass, and white clover grow well if well managed. Water control measures are needed to remove excess surface water after heavy rains. Regular applications of fertilizer and lime are needed, and grazing should be controlled to prevent overgrazing and weakening of the plants.

The soil has moderately high potential productivity for pine trees, especially for slash pine. Management concerns are restricted use of equipment during periods of heavy rainfall, seedling mortality, and plant competition. For highest yields, a simple water control system is needed to remove excess surface water.

If used as range, the soil has moderately high potential for creeping bluestem, indiangrass, chalky bluestem, various panicums, and numerous legumes and forbs. If the range is allowed to deteriorate, sawpalmetto and pineland threeawn (wiregrass) become dominant.

This soil is in capability subclass IVw.

36—Kaliga muck. This is a very poorly drained, nearly level organic soil in low depressions. Individual areas are irregular in shape and range from 3 to 20 acres in size. Slopes are less than 2 percent and are concave.

Typically, the surface layer is black muck about 25 inches thick. Below the muck there is very dark gray fine sandy loam to a depth of 35 inches, dark gray sandy clay loam to a depth of 60 inches, and very dark gray fine sandy loam to a depth of 80 inches.

Included with this soil in mapping are similar soils in which the organic material extends to a depth of 52 inches or more. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

This Kaliga soil has a water table at or near the surface for 6 to 12 months. The available water capacity is very high in the surface layer and moderate below the surface layer. Permeability is rapid in the surface layer and slow or very slow in the mineral layer between depths of 35 and 60 inches. Natural fertility is moderate. The content of organic matter is very high.

The natural vegetation consists mainly of loblollybay, scattered cypress, maple, gum, and pine trees and a

ground cover of greenbrier, ferns, and other aquatic plants.

The soil is not suitable for cultivation in its native state. If a water control system is installed, the soil has high potential for some specialized crops and for improved pasture.

The soil is not suitable for citrus trees or pine trees.

The potential of this soil for use as habitat for wetland and woodland wildlife is high. Shallow water areas are easily developed, and food and cover are abundant.

If used as range, the soil has very high potential for maidencane and cutgrass. The water level fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water level is high.

This soil is in capability subclass IIIw.

37—Basinger fine sand, depressional. This is a poorly drained soil in depressions in the flatwoods. Individual areas are circular in shape and range from 3 to 10 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 5 inches thick. The subsurface layer is fine sand about 27 inches thick. The upper 5 inches is dark grayish brown, and the lower 22 inches is grayish brown. The subsoil is mixed brown and very dark brown fine sand to a depth of about 55 inches and very dark grayish brown fine sand to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Pompano and Holopaw soils along small drainageways and Placid soils in the center of depressions. Also included are areas of similar soils that have a very thin organic surface layer or a black surface layer 10 to 14 inches thick. These soils are also in the center of depressions. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent.

In most years, this Basinger soil is covered by standing water for 6 to 9 months or more. Natural fertility is low, and response to fertilization is moderate. Internal drainage is slow, but it is rapid if artificial drainage is installed. The available water capacity is low.

A large acreage is in natural vegetation consisting of maidencane, St. John's-wort, water lilies, pickerelweed, bay, cypress, pop ash, pond pine, and other water-tolerant plants.

Under natural conditions, the soil is not suitable for cultivated crops or improved pasture. The potential of this soil for crops or pasture is very low. The lack of suitable drainage outlets precludes the use of an adequate drainage system.

The soil is used as wildlife habitat. There are watering places and feeding grounds on this soil for many kinds of wading birds and other wetland wildlife.

The soil is not suitable for the commercial production of pine trees.

If used as range, the soil has very high potential for maidencane and cutgrass. The water level fluctuates throughout the year; thus grazing is naturally deferred and forage production increases when the water level is high.

This soil is in capability subclass VIIw.

38—St. Lucie fine sand. This is an excessively drained, nearly level soil on ridgetops, knolls, and dunes in areas of sand hills. Individual areas range from 5 to 20 acres in size. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The underlying material is white fine sand to a depth of 80 inches.

Included with this soil in mapping are small areas of Pomello and Tavares soils. The soils on the small ridges in the flatwoods are likely to have a water table during the rainy season. In 80 percent of the mapped areas, the included soils make up 5 to 10 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 5 percent or more than 10 percent.

This St. Lucie soil has a water table at a depth of 72 to 120 inches. The available water capacity is very low. Natural fertility is very low. Permeability is very rapid throughout.

In some areas that have been cleared, the soil is used for citrus or pasture. The natural vegetation includes sand pine, scrub live oak, scattered turkey and bluejack oak, and an understory of scattered sawpalmetto, creeping dodder, rosemary cactus, moss, and lichens.

The soil has very low potential for cultivated crops because of extreme droughtiness and rapid leaching of plant nutrients. It is not suitable for most commonly cultivated crops. It has very low potential for improved pasture even if good management practices are used. Grasses such as pangolagrass and bahiagrass are better adapted than others. Clovers are not suited.

The soil has low potential for citrus, and yields are low even if irrigation is used.

The soil has low potential productivity for pine trees. Sand pine is the best tree to plant. Management concerns in commercial tree production are seedling mortality and mobility of equipment.

If used as range, the soil has low potential for native forage.

This soil is in capability subclass VIIs.

39—Bradenton loamy fine sand. This is a poorly drained, nearly level soil on low-lying ridges and hammocks. Individual areas are irregular in shape and range from 5 to 20 acres in size. Slopes are smooth to convex and range from 0 to 2 percent.

Figure 7.—Natural vegetation consisting of water oak, longleaf pine, and cabbage palm in an area of Bradenton loamy fine sand.

Typically, the surface layer is very dark gray loamy fine sand about 4 inches thick. The subsurface layer is fine sand about 9 inches thick. The upper 4 inches is grayish brown, and the lower 5 inches is light gray. The subsoil is fine sandy loam. The upper 6 inches is grayish brown, and the lower 7 inches is light brownish gray. The substratum is light olive gray, dark gray, or light gray fine sandy loam to a depth of 76 inches and greenish gray loamy fine sand to a depth of 80 inches.

Included with this soil in mapping are small areas of similar soils that have limestone boulders below the subsoil. Also included are small areas of Felda, Pomona, and Wabasso soils. In 90 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 10 percent of the mapped areas, the included soils make up either less than 10 percent or more than 15 percent.

This Bradenton soil has a water table at a depth of less than 10 inches for 2 to 6 months of the year. Permeability is moderate. The available water capacity is low. Natural fertility is medium, and the content of organic matter is low.

The soil is used mainly as range and woodland. In some areas that have adequate water management, it is used for improved pasture and truck crops. The natural vegetation consists mainly of slash pine, laurel and live oak, cabbage palm, sawpalmetto, southern bayberry, sweetbay magnolia, American holly, bluestems, longleaf uniola, and panicum (fig. 7).

Under natural conditions, the soil is not suitable for crops. A high water table severely restricts plant growth. If an adequate water control system can be installed, the potential is low for cultivated crops and medium for improved pasture.

The soil has high potential productivity for longleaf and slash pine. A water control system is needed to remove excess water before the trees can be planted.

If used as range, the soil has moderate potential for forage because of the dense canopy of palm trees. The trees provide shade and rest areas for cattle.

This soil is in capability subclass IIIw.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

John D. Lawrence, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Approximately 235,000 acres in the county was used for crops and pasture according to the 1980 Census of Agriculture, Soil Conservation Service "Now-on-the-Land" records, Hardee County Extension Service estimates, and Florida Agricultural Statistics, Florida Crop and Livestock Reporting Service. Of this total, 165,000 acres was used for pasture; more than 45,000 acres was used for citrus; and 25,000 acres was used for special crops, mainly cucumbers, watermelons, snap beans, sweet corn, and peppers and some squash, eggplant, field peas, sod and nursery plants, grapes, and blackberries.

The potential of the soils in Hardee County for increased food production is good. About 157,000 acres of potentially good cropland currently is used as woodland, and about 158,000 acres is used as pasture. Additional land that is presently used as woodland and pasture could be used as cropland, but intensive conservation measures are needed to control soil blowing in those areas. In addition, food production could be increased considerably by extending the latest cropland technology to all cropland in the county. This soil survey can greatly facilitate the application of such technology.

The acreage in crops, pasture, and woodland has been gradually decreasing as more and more land is used for urban development. In 1980 there was about 5,000 acres of urban land in the county; this acreage has been increasing about 10 percent a year for the past 10 years, according to estimates of the Central Florida Regional Planning Council.

Soil erosion generally is a hazard on the more sloping soils if the surface is not protected by a cover of vegetation. Also, erosion is a hazard if the slope is more than 2 percent on the well drained and moderately well drained Apopka, Candler, and Tavares soils; the somewhat poorly drained Sparr soils; and the poorly drained Ft. Green soils.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and as part of the subsoil is incorporated into the plow layer. Second, soil erosion on farmland results in sediment entering streams. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

In some areas of Ft. Green soils, preparing a good seedbed and tilling are difficult because of rock fragments.

Erosion control practices provide a protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps a vegetative cover on the soil for extended periods can hold soil losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legumes and grasses grown for forage in the cropping system help to reduce erosion on sloping soils; they also provide nitrogen and improve tilth for the following crop.

Minimizing tillage and leaving crop residue on the surface are management practices that help to increase infiltration and to reduce runoff and erosion. The practices can be adapted to most soils in the survey area. No-tillage for corn and soybeans is effective in reducing erosion on sloping soils, but it can be adapted to most soils in the survey area.

In the survey area the soils are so sandy and the slopes so short and irregular that contour tillage or terracing is not practical. Stripcropping and diversions reduce the length of the slope and help to reduce runoff and erosion. They are more practical on the deep, well drained soils that have regular slopes. On many soils used as cropland, diversions and sod waterways help to reduce runoff and erosion; they can be adapted to most soils in the survey area.

Wind erosion is a major hazard on sandy soils and on organic soils. In a few hours it can damage soils and tender crops in open, unprotected areas if the winds are strong and the soil is dry and bare of vegetation and surface mulch. Maintaining a vegetative cover and mulching the surface minimize wind erosion.

Wind erosion is damaging for several reasons. It reduces soil fertility by removing the finer soil particles and organic matter from the soil; it damages or destroys crops by sandblasting; it spreads diseases, insects, and weed seeds; and it creates health hazards and cleaning problems. Control of wind erosion minimizes duststorms and improves the quality of air.

Field windbreaks of adapted trees and shrubs, such as Carolina cherry laurel, slash pine, Southern red cedar, and Japanese privet, and strip crops of small grains are effective in reducing wind erosion and crop damage. Field windbreaks and strip crops are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The intervals depend on the erodibility of the soil and on the susceptibility of the crop to damage from sandblasting.

Information on the design of erosion control practices for each kind of soil is contained in the "Water and Wind Erosion Control Handbook—Florida," which is available at local offices of the Soil Conservation Service.

Soil drainage is a major management concern on much of the acreage used for crops and pasture in the survey area. Some soils are naturally so wet that the production of crops common to the area is generally not practical. These are the poorly drained Bradenton, Felda, Holopaw, Myakka, Ona, Pomona, Pompano, Smyrna, Wabasso, and Wauchula soils and the very poorly drained Chobee, Floridana, Manatee, Placid, and Popash soils.

Unless artificially drained, some of the somewhat poorly drained soils are wet enough in the root zone to cause damage to most crops in most years during the wet seasons. Included in this category are Adamsville, Sparr, and Zolfo soils.

Unless artificially drained, some of the poorly drained soils are wet enough to cause some damage to pasture plants during the wet seasons. These soils are the Myakka, Ona, Pomona, Pompano, Smyrna, Wabasso, and Wauchula soils. A subsurface irrigation system is needed on these soils for adequate pasture production.

The very poorly drained soils are very wet during rainy periods. In most areas water stands on the surface and the production of pasture of good quality is not possible if artificial drainage is not used. The Chobee, Floridana, Hontoon, Kaliga, Manatee, Placid, Popash, and Samsula soils are very poorly drained.

The design of surface drainage and subsurface irrigation systems varies with the kind of soil and the pasture. For intensive pasture production, a combination of these systems is needed. Information on the drainage and irrigation needed for each kind of soil is contained in the "Technical Guide," which is available at local offices of the Soil Conservation Service.

Soil fertility is naturally low on most soils in the survey area. Most of the soils have a sandy surface layer and are light colored. The Apopka, Felda, Ft. Green, and Sparr soils have a loamy subsoil. The Adamsville, Candler, Placid, Pompano, St. Lucie, Tavares, and Zolfo soils have sandy material to a depth of 80 inches or more. The Basinger, Cassia, Electra, Farmton, Jonathan, Myakka, Ona, Pomello, Pomona, Smyrna, Wabasso, and Wauchula soils have a dark colored sandy subsoil that has organic carbon.

Most of the soils have a surface layer that is strongly acid or very strongly acid. Applications of ground limestone are required to raise the pH level sufficiently for good growth of crops. The levels of nitrogen, potassium, and available phosphorus are naturally low in most of the soils. On all the soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crops, and on the expected level of

yields. The Cooperative Extension Service can help in determining the kind and amount of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous.

All the soils have a sandy surface layer that is low to moderate in content of organic matter except the Chobee, Floridana, Hontoon, Kaliga, Manatee, Placid, Popash, and Samsula soils. The Chobee, Floridana, Manatee, Placid, and Popash soils have a sandy, dark surface layer that is high in content of organic matter. The Kaliga, Hontoon, and Samsula soils are organic soils and have an organic surface layer. Generally, the structure of the surface layer of most soils is weak. Most of the excessively drained and well drained soils are low in content of organic matter and are droughty. Conservation tillage helps to improve soil structure and to increase the moisture available to crops.

Fall plowing generally is not a good practice. About one-fourth of the cropland is on sloping soils that are subject to damaging erosion if they are plowed in fall. In addition, about three-fourths of the cropland is subject to soil blowing.

Field crops are grown on a small acreage in Hardee County. The acreage of corn, grain sorghum, sunflowers, and sugarcane could be increased if economic conditions warrant an increase. Rye is the commonly grown close-growing crop, but wheat, oats, and triticale can also be grown.

Special crops grown commercially are citrus, watermelons, cucumbers, peppers, and some squash, eggplant, cabbage, snap beans, grapes, blackberries, nursery plants, and sod. If economic conditions are favorable, the acreage of grapes, blackberries, nursery plants, sod, cabbage, cauliflower, turnips, and mustard can be increased.

If irrigated, deep soils that have good natural drainage, for example, Apopka and Candler soils on slopes of less than 5 percent, are especially well suited to many vegetables and small fruits. If irrigated, the Sparr, Tavares, and Zolfo soils are very well suited to vegetables and citrus. If adequately drained, the Adamsville, Farmton, Felda, Kaliga, Hontoon, Immokalee, Ona, Pomona, Samsula, Smyrna, Wabasso, and Wauchula soils are very well suited to vegetables and citrus.

The well drained and moderately well drained soils are suitable mainly for citrus and nursery plants. Soils in low areas where air drainage is poor and frost pockets are common generally are poorly suited to early vegetables, small fruits, and citrus.

The latest information on special crops can be obtained from local offices of the Cooperative Extension Service and of the Soil Conservation Service.

Pasture is used to produce forage for beef and dairy cattle. Beef cattle and cow-calf operations are the major livestock enterprises. Bahiagrass and Coastal bermudagrass are the major pasture plants grown. Grass seeds could be harvested from these grasses for improved pasture plantings as well as for commercial purposes. In summer, excess grass is harvested from Coastal bermudagrass as hay for feeding cattle in winter.

The well drained Apopka soils, the excessively drained Candler soils, and the moderately well drained Tavares soils are well suited to bahiagrass and improved bermudagrass. Under good management, hairy indigo and alsike clover may be grown in summer and fall.

The somewhat poorly drained Adamsville, Sparr, and Zolfo soils are well suited to bahiagrass, improved bermudagrass, and legumes such as sweet clover, but adequate lime and fertilizer are needed.

If drained, Basinger, Bradenton, Cassia, Farmton, Felda, Floridana, Holopaw, Immokalee, Manatee, Ona, Placid, Pomona, Popash, Smyrna, Wabasso, and Wauchula soils are well suited to pasture of bahiagrass and hemerthria grass. Subsurface irrigation helps to increase the length of the growing season and total forage production. Legumes such as white clover are well suited if adequate amounts of lime and fertilizer are added to the soils.

In some parts of the county, pasture is greatly depleted by continuous excessive grazing. Yields of pasture are increased by adding lime and fertilizer, growing legumes, and using irrigation and other management practices.

Differences in the amount and kind of pasture yields are closely related to the kind of soil. Management of pasture is based on the relationship of soils, pasture plants, lime, fertilizer, moisture, and management.

The latest information about pasture can be obtained from local offices of the Cooperative Extension Service and of the Soil Conservation Service.

Most of the land currently used for pasture will be mined for phosphate and eventually reclaimed. The reclaimed areas will likely be reseeded to an improved pasture grass such as improved bermudagrass, pangolagrass, or bahiagrass.

Expected yields, under a high level of management, of a grass and a legume suited to the soils are shown in table 4. The yields are in animal unit months (AUM), the amount of forage needed for one cow and her calf for 1 month.

Erosion control in urban areas and on disturbed soils is necessary if rains are intense and if the soils are bare of vegetation and surface mulch.

Grading removes topsoil and can expose the sandy clay loam or sandy clay subsoil in the Bradenton, Felda, Sparr, Wabasso, and Wauchula soils. Ripping the exposed subsoil and covering it with less erodible topsoil help to reduce erosion.

Erosion control practices provide protective cover, reduce runoff, and increase infiltration. Diversions and contouring reduce the length of the slope, reduce runoff,

and help control erosion. They are most practical on soils that have uniform slopes.

On sandy soils, maintaining a vegetative cover and mulching the surface minimizes soil blowing. Windbreaks of adapted trees and shrubs and strip crops of small grains help to reduce wind erosion.

Clearing and disturbing the minimum area necessary to construct the works of improvement helps to reduce runoff and soil blowing. Mulching helps to reduce damage from runoff and soil blowing and improves moisture conditions for seedlings.

Information on the erosion control practices needed for each kind of soil is available at local offices of the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 4. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 4 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes (*11*).

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have

other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 5. The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland and Grazable Woodland

Kathryn F. Heacock, range conservationist, Soil Conservation Service, helped prepare this section.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 6 shows, for each soil listed, the range site and the total annual production of vegetation in favorable, normal, and unfavorable years. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in table 6 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Woodland Management and Productivity

Hal E. Brockman, forester, Soil Conservation Service, helped prepare this section.

Approximately 157,000 acres, or 39 percent, of the total land area in Hardee County is woodland. Nearly all of this acreage is privately owned. The pine trees scattered throughout the county are in areas that are not considered to be woodland.

South Florida slash pine, which grows predominantly in the flatwoods, makes up most of the woodland. Economically, it is the most important tree in the survey area. It is used mainly for the production of pulpwood and lumber. Sand pine grows in small areas along the higher sand ridges in the central and western parts of the county. Most of the sand pine does not have high economic value.

The oak-gum-cypress type makes up a sizable part of the forested land. This type grows in the freshwater swamps along the river systems (*10*). The stands of oak-gum-cypress and their associated species, such as maple, are economically valuable as sawtimber. These areas, however, may be more valuable for the wildlife they harbor and for the water resources they protect than for the timber they could produce. Stands of mixed oak and hickory grow on the floodplains of the Peace River and its tributaries. These stands are not economically valuable as timber but are highly valuable as wildlife habitat and as recreation areas.

In recent years intensive farming and wildfire have reduced the areas of woodland. Some of the areas protected from wildfire have been reverting back to pine.

In December 1979, 101,850 acres, or more than 25 percent of the land area in Hardee County, was under lease for phosphate mining, according to the Florida

Phosphate Council. Moreover, the number of mining leases has been increasing. In mined areas all natural vegetation, including trees, is destroyed.

The county has scattered markets for wood products, such as lumber, fenceposts, and pulpwood. Woodland management generally consists of natural regeneration following a harvest cut or a clearcut. Prescribed burning is important in forest management. It is used extensively to reduce the "rough." It also helps to facilitate natural regeneration and can increase production of forage in woodland. Prescribed burning, however, is a hazard to wildlife.

More detailed information about woodland management can be obtained at the local office of the Soil Conservation Service, of the County Extension Service, and of the Florida Division of Forestry.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol (woodland suitability) for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil, and the letter *s* indicates sandy texture. If a soil has more than one limitation, the priority is as follows: w and s.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index is based on an age of 25 years for South Florida slash pine and of 50 years for all other pines. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

Recreation

Facilities are available in Hardee County for a variety of recreation activities, including fishing, hunting, swimming, boating, canoeing, and horseback riding. A number of parks and playgrounds are available for public use. The main camping and recreation area is the Pioneer Park Wildlife Sanctuary, located just north of Zolfo Springs on the Peace River. There, the wilderness has been preserved, and facilities for canoeing, hiking, and fishing are available. The museum has artifacts dating back to the days of Hernando de Soto, the Spanish explorer who came to America in the 16th century.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John F. Vance, Jr., biologist, Soil Conservation Service, helped prepare this section.

Wildlife habitat is adequate in most areas in Hardee County. The areas of wetland surrounding Charlie Creek, Horse Creek, and the Peace River are particularly valuable as habitat.

The primary game species are deer, wild turkey, and quail. In most areas they are plentiful. Other game species include squirrel and Florida duck. Nongame species include raccoon, opossum, armadillo, gray fox, bobcat, otter, mink, skunk, and a variety of songbirds, woodpeckers, wading birds, reptiles, and amphibians.

Areas of concern include the changes to wildlife habitat caused by intensive farming such as growing citrus or improved pasture. The acreages in citrus and improved pasture are now large but are interspersed with other areas that provide good food and cover for wildlife. Overall, therefore, wildlife habitat is adequate. Some areas of native rangeland could provide better wildlife habitat if improved grazing and burning practices were used. In addition, phosphate mining disrupts large areas of natural wildlife habitat. The habitat, however, can be reestablished to an adequate stage through proper reclamation.

The endangered and threatened species found in the county range from the rare red-cockaded woodpecker to

the more common alligator and wood stork. A detailed list of such species and information on their needs for range and habitat are available at the local office of the Soil Conservation Service.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, soybeans, wheat, browntop millet, and grain sorghum.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, clover, and sesbania.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, partridge pea, and bristlegrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, sawpalmetto, dahoon holly, red maple, wild grape, sugarberry, water hickory, blackberry, and huckleberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are firethorn, waxmyrtle, and blackberry.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cypress, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and cattails.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, sandhill crane, and cottontail.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, herons, otter, mink, and beaver.

Wildlife Management Practices

Wildlife habitat management thrives on disturbances such as controlled burning, grazing, chopping, cultivation, water level manipulation, mowing, and sometimes the use of pesticides. Each species of wildlife occupies a niche in a vegetative type; therefore, management for a particular species involves an attempt to keep the vegetative community in the stage or stages that favor that species.

A primary factor in evaluating wildlife habitat is the plant diversity in an area. A wide range in the interspersion of vegetative types or age classes generally is more favorable to wildlife. Increasing dominance by a few plant species generally is accompanied by a corresponding decrease in numbers of wildlife.

Engineering

James E. Thomas, area engineer, Soil Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils. Additional testing and analysis by personnel experienced in the design and construction of engineering works may be necessary.

State and local government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging,

filling, and compacting is affected by the depth to bedrock, a cemented layer, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level

of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing and seepage.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plant growth. Material from the surface layer, therefore, should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock

fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the

root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 21.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 21.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and

sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Some soils in the county are assigned to two hydrologic soil groups. The dual grouping is used if the soils have a seasonal high water table and if the intake of water improves with drainage. The first letter in the dual grouping applies to the drained condition and the second letter to the undrained condition.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An

artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 16 shows the expected initial subsidence, which usually is a result of drainage, and annual subsidence, which usually is a result of oxidation.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Table 17 gives data on the depth to the water table in some of the soils in the survey area.

Physical, Chemical, and Mineralogical Analyses of Selected Soils

By Dr. V.W. Carlisle and Dr. R.E. Caldwell, Professors of Soil Science, University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations and Soil Science Department.

Parameters for physical, chemical, and mineralogical properties of representative pedons sampled in Hardee County are presented in tables 18, 19, and 20. The analyses were conducted and coordinated by the Soil Characterization Laboratory at the University of Florida. Detailed profile descriptions of soils analyzed are given in alphabetical order in the section "Classification of the Soils." Laboratory data and profile information for additional soils in Hardee County as well as for other counties in Florida are on file at the University of Florida, Soil Science Department.

Typical pedons were sampled in pits at carefully selected locations. Samples were air dried, crushed, and sieved through a 2-mm screen. Most analytical methods used are outlined in Soil Survey Investigations Report No. 1 (*12*).

Particle-size distribution was determined using a modified pipette method with sodium hexametaphosphate dispersion. Saturated hydraulic conductivity and bulk density were determined on undisturbed soil cores. Saturated hydraulic conductivity, or permeability, is the rate at which water moves downward through saturated soils. Water retention parameters were obtained from duplicate undisturbed soil cores placed in tempe pressure cells. Weight percentages of water retained at 100 cm water (1/10 bar) and 345 cm water (1/3 bar) were calculated from volumetric water percentages divided by bulk density. Samples were ovendried and ground to pass a 2-mm sieve, and the 15-bar water retention was determined. Organic carbon was determined by a modification of the Walkley-Black wet combustion method.

Extractable bases were obtained by leaching soils with *N* ammonium acetate buffered at pH 7.0. Sodium and potassium in the extract were determined by flame emission, and calcium and magnesium by atomic absorption spectrophotometry. Extractable acidity was determined by the barium chloridetriethanolamine method at pH 8.2. Cation exchange capacity was calculated by summation of extractable bases and extractable acidity. Base saturation is the ratio of extractable bases to cation exchange capacity expressed in percent. The pH measurements were made with a glass electrode using a soil water ratio of 1:1; a 0.01 *M* calcium chloride solution in a 1:2 soil-solution ratio; and *N* potassium chloride solution in a 1:1 soil-solution ratio.

Electrical conductivity determinations were made with a conductivity bridge on 1:1 soil to water mixtures. Iron and aluminum extractable in sodium dithionite-citrate were determined by atomic absorption spectrophotometry. Aluminum, carbon, and iron were extracted from probable spodic horizons with 0.1 *M* sodium pyrophosphate. Determination of aluminum and iron was by atomic absorption, and of extracted carbon by the Walkley-Black wet combustion method.

Mineralogy of the clay fraction that was greater than 0.002 mm was ascertained by X-ray diffraction. Peak heights at 18 angstrom, 14 angstrom, 7.2 angstrom, and

4.31 angstrom positions represent montmorillonite, interstratified expandable vermiculite or 14-angstrom intergrades, kaolinite, and quartz, respectively. Peaks were measured, summed, and normalized to give the percentage of soil minerals identified in the X-ray diffractograms. These percentage values do not indicate absolute determined quantities of soil minerals but do imply a relative distribution of minerals in a particular mineral suite. Absolute percentages would require additional knowledge of particle size, crystallinity, unit structure substitution, and matrix problems.

The particle-size fraction in all horizons of selected soils is given in table 18. Sand is the dominant particle-size fraction. All horizons of Cassia, Smyrna, Tavares, and Zolfo soils are more than 90 percent sand. Cassia, Jonathan, Myakka, Smyrna, Tavares, and Zolfo soils are less than 5 percent clay throughout. Apopka, Electra, Farmton, Pomona, Sparr, and Wauchula soils are inherently sandy to a depth of more than 1 meter, but increase in content of clay in the lower horizons. Felda and Ft. Green soils are inherently sandy to a depth of slightly less than 1 meter, and Bradenton soils are sandy to a depth of less than 0.5 meter. Ona and Pomello soils also have large amounts of sand throughout their profile; however, the amount of clay increases in the surface layer of Ona soils and in the B2h horizon of Pomello soils. All soils were less than 1 percent very coarse sand. Except for the Farmton soils, the sand fraction of mineral horizons of all soils was dominated by fine sand. Although silt generally makes up less than 5 percent of all soils, the amounts of silt commonly increases in the argillic and spodic horizons. Droughtiness is a common characteristic of sandy soils, particularly those that are moderately well drained, well drained, and excessively drained.

Hydraulic conductivity values, as expected, are very high for all horizons of the Tavares soils. Contrastingly, in some argillic horizons of Apopka, Bradenton, Electra, Farmton, Felda, Pomona, Sparr, and Wauchula soils, the hydraulic conductivity nears or is zero. Generally, sandy horizons that are 95 percent or more sand and that are low in content of organic matter retain a low amount of water. Available water for plants can be estimated from bulk density and water content data. Apopka, Electra, Jonathan, Pomello, Sparr, and Tavares soils, to a depth of more than 1 meter, retain a very low amount of water available for plants. The surface horizon of Kaliga muck, an organic soil, retains the greatest amount of water available for plants.

The chemical properties of selected soils is given in table 19. The cation-exchange capacity exceeds 10 milliequivalents per 100 grams in the surface horizon of Bradenton, Farmton, Ft. Green, Kaliga, Myakka, Ona, and Zolfo soils. Except for Zolfo soils, the surface horizon of these soils also is more than 3 percent organic carbon. Calcium generally is the predominant base, followed by magnesium. In all soils, sodium and potassium consistently occur in very low amounts in all horizons. In Bradenton, Farmton, Kaliga, Ona, and Zolfo soils, calcium in the surface horizon exceeds 5 milliequivalents per 100 grams. Most of these surface horizons also contain the most magnesium. Within a pedon the values of the cation-exchange capacity increase as expected in Bh and B2t horizons. The values of cation-exchange capacity in the argillic horizon of Bradenton, Electra, Farmton, Felda, Ft. Green, Kaliga, Pomona, and Wauchula soils are higher than those in the argillic horizon of the Apopka and Sparr soils. The higher values are attributed to the presence of the much more highly reactive montmorillonitic clays.

Soils with a low cation-exchange capacity in the surface horizon, such as Electra, Felda, Pomello, Sparr, and Tavares soils, require only small amounts of lime to significantly alter both base status and soil reaction in the upper horizons. Successful crop production on these soils usually requires small but frequent applications of fertilizer.

None of the soils sampled have cation-exchange capacity values throughout their profile in excess of 10 milliequivalents per 100 grams, and in most of the soils several horizons have cation-exchange capacity values that are less than 5 milliequivalents per 100 grams. Generally, low values for extractable bases and for cation-exchange capacity indicate low inherent soil fertility, and high values for extractable bases, for cation-exchange capacity, and for base saturation indicate high soil fertility.

In Apopka, Cassia, Electra, Jonathan, Pomello, Pomona, Sparr, Tavares, and Zolfo soils, organic carbon in the surface horizon is less than 1.5 percent. The content of organic carbon decreases rapidly with depth in all soils except Cassia, Electra, Farmton, Jonathan, Myakka, Pomello, Pomona, Smyrna, and Wauchula soils. These soils have a Bh horizon that contains enhanced amounts of organic carbon. The greatest amount of organic carbon occurs in the Oa horizon of Kaliga muck. Because organic carbon is directly related to the capacity of sandy soils to retain soil nutrients and water, management practices are needed to conserve the content of organic carbon.

Electrical conductivity values are consistently less than 0.5 millimhos per centimeter, indicating a low soluble salt content in the soils in Hardee County. These values generally have to be in excess of 3 millimhos per centimeter before growth of salt-sensitive plants is affected.

Soil reaction in water ranges between pH 4.0 and 6.5 in all horizons of the Apopka, Cassia, Farmton, Ft. Green, Jonathan, Myakka, Ona, Pomello, Pomona, Smyrna, Tavares, and Wauchula soils. Reaction in excess of pH 7.0 occurs only in the lower horizons of Bradenton and Kaliga soils. Soil reaction generally is 0.5 to 1.5 units lower in a solution of calcium chloride or potassium chloride than in water. Maximum availability of

plant nutrients usually is attained when reaction is between pH 6.5 and 7.0.

Sodium pyrophosphate extractable iron is 0.04 percent or less in selected horizons of Spodosols. The ratio of pyrophosphate extractable carbon and aluminum to clay in Cassia, Electra, Farmton, Jonathan, Myakka, Ona, Pomello, Pomona, Smyrna, Wauchula, and Zolfo soils is sufficient to meet the chemical criteria for spodic horizons. With the exception of Ona soils, values of citrate-dithionite extractable aluminum are less than 0.50 percent, and iron values by this extraction are in excess of 0.50 percent only in the Apopka, Electra, and Sparr soils. The soils in Hardee County contain insufficient aluminum and iron to affect detrimentally the content of phosphorus available to plants.

Mineralogy of the sand fraction (2 to 0.05 millimeters) is siliceous; quartz is dominant in all soils. Small amounts of heavy minerals, mostly ilmenite, occur in most horizons; the greatest concentration of them is in the very fine sand fraction. Crystalline mineral components of the clay fraction (less than 0.002 millimeters) are reported in table 20 for selected horizons of specific pedons. The clay mineralogical suite is composed of montmorillonite, a 14-angstrom intergrade mineral, kaolinite, and quartz. Montmorillonite occurs in the Bradenton, Cassia, Farmton, Felda, Ft. Green, Kaliga, Pomello, Pomona, Wauchula, and Zolfo soils. Except for Bradenton, Kaliga, Pomello, and Wauchula soils, the 14-angstrom intergrade mineral occurs in some horizons of all soils. Kaolinite occurs in all soils except the Smyrna and Wauchula soils. Quartz occurs in all soils.

Montmorillonite, the least stable of the mineral components in the present environment, appears to have been inherited in the Bradenton, Felda, Ft. Green, Kaliga, Pomona, and Wauchula soils, which have relatively large amounts that increase with depth. In soils that contain appreciable amounts of montmorillonitic clay, a considerable change in volume could result from shrinking of the soil when it is dry and swelling when it is wet. Horizons in Bradenton, Felda, Kaliga, Pomona, and Wauchula soils that contain large amounts of montmorillonite contain little or no 14-angtrom intergrade and commonly contain very low amounts of kaolinite. The general tendency of 14-angstrom intergrade to decrease with depth, accompanied by the general, although not consistent, tendency of kaolinite to increase with depth, suggests that the 14-angstrom intergrade is the most stable species in this weathering environment. Soils dominated by kaolinite and quartz have a lower cation-exchange capacity and retain less plant nutrients than soils dominated by 14-angstrom intergrade minerals and montmorillonite.

Engineering Index Test Data

Table 21 shows engineering test data about some of the major soils in the survey area. The tests were made by the Soils Laboratory, Bureau of Materials and Research, Florida Department of Transportation, to help evaluate the soils for engineering purposes. The classifications given are based on data obtained by mechanical analysis and by tests to determine liquid limits and plastic limits.

The mechanical analyses were made by a combined sieve and hydrometer method (*3*). In this method, the various grain-size fractions are calculated on the basis of all the material in the soil sample, including that coarser than 2 millimeters in diameter. The mechanical analyses used in this method should not be used in naming textural classes of soils.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of the soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from semisolid to plastic.

If the moisture content is increased more, the material changes from plastic to liquid. The plastic limit is the moisture content at which the soil material changes from semisolid to plastic, and the liquid limit is the moisture content at which the soil material changes from plastic to liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. The data on liquid limit and plasticity index in this table are based on laboratory tests of soil samples.

Compaction, or moisture-density, data are important in earthwork. If soil material is compacted at a successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases with an increase in moisture content. The highest dry density obtained in the compactive test is termed maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*13*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Psammaquents (*Psamm*, meaning sand texture, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Psammaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is siliceous, hyperthermic Typic Psammaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*9*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*13*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Adamsville Series

The Adamsville series consists of nearly level, somewhat poorly drained soils that formed in thick beds of sandy marine sediment. These soils are on low, broad flats that are less than 2 feet higher than the adjacent sloughs. In most years, if the soils are not drained, the water table rises to within 20 inches of the surface for less than 2 weeks in very wet seasons; it remains at a depth of 20 to 40 inches for 2 to 6 months and recedes to a depth of more than 40 inches during dry periods. Slopes range from 0 to 2 percent. These soils are hyperthermic, uncoated Aquic Quartzipsamments.

Adamsville soils are near Basinger, Myakka, Pompano, Tavares, and Zolfo soils. Basinger soils are poorly drained and have a Bh&A horizon. Myakka soils are poorly drained and have a spodic horizon within a depth of 30 inches. Pompano soils are poorly drained and are in poorly defined drainageways and in depressions. Tavares soils are at slightly higher elevations and do not have mottles (evidence of wetness) between depths of 20 and 40 inches. Zolfo soils are in about the same position on the landscape as Adamsville soils but have a spodic horizon between depths of 50 and 80 inches.

Typical pedon of Adamsville fine sand, in an orange grove, approximately 100 feet east of Dr. Banks Road and 100 feet north of State Highway 664A, SE1/4SW1/4 sec. 23, T. 33 S., R. 25 E.

Ap—0 to 7 inches; dark gray (10YR 4/1) fine sand; single grained; loose; few fine and medium roots; mixture of organic matter and light gray sand grains has a salt-and-pepper appearance; neutral; abrupt smooth boundary.

C1—7 to 23 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; few fine and medium roots; sand grains uncoated; slightly acid; clear smooth boundary.

C2—23 to 31 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; sand grains uncoated; medium acid; gradual smooth boundary.

C3—31 to 52 inches; light gray (10YR 7/2) fine sand; many medium distinct yellowish brown (10YR 5/8) mottles; single grained; loose; loose sand grains coated in mottled part, uncoated in matrix; medium acid; gradual smooth boundary.

C4—52 to 70 inches; white (10YR 8/1) fine sand; few fine distinct yellowish brown (10YR 5/8) mottles; single grained; loose; loose sand grains coated in mottled part, uncoated in matrix; slightly acid; gradual smooth boundary.

C5—70 to 80 inches; light gray (10YR 7/2) fine sand; few fine distinct yellowish brown (10YR 5/4) mottles; single grained; loose; slightly acid.

The A and C horizons combined are 80 inches thick or more. Reaction ranges from strongly acid to neutral throughout. The content of silt plus clay is less than 5 percent in the 10- to 40-inch control section.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 1 or 2. It is 3 to 8 inches thick.

The C horizon has hue of 10YR, value of 5 through 8, and chroma of 1 through 4. In the lower part it generally has chroma of 1 or 2. Its texture is fine sand or sand. The horizon generally has mottles in shades of gray, yellow, and brown.

Apopka Series

The Apopka series consists of nearly level to gently sloping, well drained soils that formed in sandy and loamy marine deposits. The soils are on uplands. Slopes range from 0 to 5 percent. These soils are loamy, siliceous, hyperthermic Grossarenic Paleudults.

Apopka soils are near Candler and Sparr soils. Candler soils are in about the same position on the landscape as Apopka soils but do not have an argillic horizon. Sparr soils are in the lower part of the landscape and are somewhat poorly drained.

Typical pedon of Apopka fine sand, 0 to 5 percent slopes, in an orange grove, 100 feet north of Dr. Coil Road, 2 miles west of Bowling Green, SW1/4NE1/4NE1/4 sec. 7, T. 33 S., R. 25 E.

Ap—0 to 8 inches; dark gray (10YR 4/1) fine sand; weak fine crumb structure; friable; common fine roots; slightly acid; clear smooth boundary.

A21—8 to 20 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; common fine and medium roots; many uncoated sand grains; strongly acid; gradual wavy boundary.

A22—20 to 36 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common fine and medium roots; many uncoated sand grains; strongly acid; clear wavy boundary.

A23—36 to 55 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; few roots; few brownish yellow (10YR 6/8) loamy fine sand lamellae; strongly acid; clear wavy boundary.

B1t—55 to 65 inches; yellow (10YR 7/8) loamy fine sand; weak fine subangular blocky structure; friable; thin strong brown (7.5YR 5/8) clay films on faces of peds and walls of pores; sand grains coated and bridged with clay; few medium pebbles; strongly acid; gradual wavy boundary.

B21t—65 to 70 inches; strong brown (7.5YR 5/8) and brownish yellow (10YR 6/6) sandy clay loam; moderate medium subangular blocky structure; firm; thin patchy yellowish brown (10YR 5/6) clay films on faces of peds and walls of pores; sand grains coated and bridged with clay; few medium pebbles; few roots; strongly acid; gradual wavy boundary.

B22t—70 to 80 inches; reddish yellow (7.5YR 6/8) sandy clay loam; moderate medium subangular blocky structure; firm; thin yellowish brown (10YR 5/6) clay films on faces of peds; few red (2.5YR 5/8) soft plinthite bodies; light gray (10YR 7/1) material in old root channels; sand grains coated and bridged with clay; few fine roots; very strongly acid.

Apopka soils are medium acid to very strongly acid except where the Ap horizon has been limed.

The A1 or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is 3 to 8 inches thick.

The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 4 through 6. It ranges from 37 to 75 inches in thickness. Its texture is fine sand or sand. Texture of the lamellae bands is loamy fine sand or

sandy loam. The A horizon ranges from 40 to 79 inches in thickness.

The Bt horizon has hue of 5YR through 10YR, value of 4 through 7, and chroma of 4 through 8. Its texture is sandy loam or sandy clay loam. The horizon ranges from 10 to 26 inches or more in thickness. The weighted content of clay in the upper 20 inches of the argillic horizon ranges from 18 to 35 percent.

The B3 horizon has hue of 10YR, value of 8, and chroma of 4. There is no B3 horizon in some pedons.

Base saturation in the B22t horizon is greater than 35 percent. Consequently, Apopka soils in Hardee County are considered to be a taxadjunct to the series. This difference, however, does not affect the use or behavior of the soils. It is estimated that in at least half of the mapped areas of Apopka soils in Hardee County the base saturation is less than 35 percent at a depth of 71 inches.

Basinger Series

The Basinger series consists of nearly level, poorly drained sandy soils in poorly defined drainageways, wet depressions, and sloughs in the flatwoods. The soils formed in thick deposits of marine sand. In most years, if the soils are not drained, the water table is at a depth of less than 10 inches for 2 to 6 months and at a depth of 10 to 30 inches for more than 6 months. In most years the soils in depressions are covered by standing water for 6 to 9 months or more. Slopes are less than 2 percent. These soils are siliceous, hyperthermic Spodic Psammaquents.

Basinger soils are near Floridana, Myakka, Pomona, Popash, Tavares, and Wauchula soils. Floridana and Popash soils have a dark colored A horizon. Pomona and Wauchula soils have a spodic horizon and an argillic horizon. Myakka soils have a spodic horizon. Tavares soils are moderately well drained and are on higher ridges adjacent to the flatwoods.

Typical pedon of Basinger fine sand, in a pasture, about 0.1 mile south of Wauchula and 0.2 mile east of U.S. Highway 17, SE1/4SW1/4NW1/4 sec. 10, T. 34 S., R. 25 E.

A1—0 to 3 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; many uncoated sand grains; very strongly acid; clear smooth boundary.

A12—3 to 7 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.

A2—7 to 14 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; many fine roots; many clean sand grains; very strongly acid; clear wavy boundary.

Bh&A—14 to 24 inches; dark brown (7.5YR 4/4) and grayish brown (10YR 5/2) fine sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C1—24 to 30 inches; brown (10YR 5/3) fine sand; single grained; loose; very strongly acid; gradual wavy boundary.

C2—30 to 80 inches; light gray (10YR 7/2) fine sand; common medium brown (10YR 5/3) mottles; single grained; nonsticky; very strongly acid.

Basinger soils are very strongly acid throughout. In the C1 and C2 horizons the content of organic matter is less than 1 percent and the content of iron is less than 0.5 percent.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 2 or less. It is 2 to 8 inches thick. The A2 horizon has hue of 10YR, value of 4 through 7, and chroma of 3 or less. It is about 17 to 25 inches thick.

The Bh&A horizon has hue of 10YR, 7.5YR, or 5YR; value is 3 through 6, and chroma is 2 through 4. The colors are mixed. The horizon does not meet the requirements of a spodic horizon. It is about 8 to 12 inches thick.

The C horizon has hue of 10YR or 2.5Y, value of 5 through 8, and chroma of 1 through 3. It has common brown mottles.

Bradenton Series

The Bradenton series consists of nearly level, poorly drained soils that formed in unconsolidated loamy textured sediment influenced by calcareous material. The soils are on flood plains and on low-lying hammocks in the area of the flood plains. The water table is within 10 inches of the surface for 2 to 6 months of the year. Generally, the soils are flooded every year and more than once in most years. Slopes are less than 2 percent. These soils are coarse-loamy, siliceous, hyperthermic Typic Ochraqualfs.

Bradenton soils are near Felda, Pomona, Popash, and Wabasso soils. Felda and Popash soils have a sandy A horizon more than 20 inches thick. Pomona and Wabasso soils have a spodic horizon.

Typical pedon of Bradenton loamy fine sand, in a wooded area, 2.5 miles south of State Highway 64 and 1.75 miles west of the Highlands County line, on Smith Ranch, SW1/4NW1/4 sec. 2, T. 34 S., R. 27 E.

A1—0 to 4 inches; very dark gray (10YR 3/1) loamy fine sand; moderate medium crumb structure; friable; many fine and medium roots; mixture of organic matter and light gray sand grains has a salt-and-pepper appearance; medium acid; clear smooth boundary.

A21—4 to 8 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; common fine and medium roots; medium acid; clear smooth boundary.

A22—8 to 13 inches; light gray (10YR 7/2) fine sand; single grained; loose; common fine roots; medium acid; abrupt smooth boundary.

B21tg—13 to 20 inches; grayish brown (10YR 5/2) fine sandy loam; many fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; common fine roots; few thin discontinuous clay films on faces of peds and in root channels; medium acid; gradual wavy boundary.

B22tgca—20 to 27 inches; light brownish gray (2.5Y 6/2) fine sandy loam; weak coarse subangular blocky structure; firm; common medium roots; few thin discontinuous clay films on faces of peds and in root channels; common soft white calcium carbonate accumulations and common fine white calcium carbonate nodules; slightly acid; clear wavy boundary.

C1ca—27 to 36 inches; light olive gray (5Y 6/2) fine sandy loam; massive; slightly sticky; common medium carbonate nodules; few streaks and pockets of white sand; strongly alkaline; calcareous; clear wavy boundary.

C2ca—36 to 56 inches; dark gray (5Y 4/1) fine sandy loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; slightly sticky; common medium carbonate nodules; few streaks and pockets of white sand; strongly alkaline; calcareous; clear wavy boundary.

C3ca—56 to 76 inches; light gray (5Y 7/1) fine sandy loam; common medium distinct yellowish brown (10YR 5/8) and light greenish gray (5GY 7/1) mottles; massive; slightly sticky; common medium carbonate nodules; common streaks and pockets of white sand; strongly alkaline; calcareous; gradual wavy boundary.

C4ca—76 to 80 inches; greenish gray (5GY 6/1) loamy fine sand; massive; slightly sticky; common streaks and pockets of white sand; moderately alkaline.

The solum ranges from 20 to 50 inches in thickness. Reaction is medium acid to neutral in the A horizon, slightly acid to moderately alkaline in the B horizon, and mildly alkaline to strongly alkaline in the C horizon.

The A1 or Ap horizon has no hue (N) or has hue of 10YR or 2.5Y; value is 2 to 4, and chroma is 2 or less. It is 4 to 6 inches thick. The A2 horizon has no hue (N) or has hue of 10YR; value is 4 to 7, and chroma is 2 or less. It is 8 to 16 inches thick. It is fine sand or sand.

The Bt horizon has no hue (N) or has hue of 10YR or 2.5Y; value is 4 to 6, and chroma is 2 or less. In most pedons it has few to many yellow, brown, or red mottles. It ranges from 8 to 30 inches in thickness. Its texture is sandy loam, fine sandy loam, or sandy clay loam. The B3g horizon has no hue (N) or has hue of 10YR or 2.5Y; value is 5 to 7, and chroma is 2 or less. Its texture is sandy loam. There is no B3g horizon in some pedons.

The Cca horizon has no hue (N) or has hue of 10YR, 5Y, 5GY, or 2.5Y; value is 4 through 7, and chroma is 2 or less. Its texture ranges from loamy fine sand to sandy loam. In most pedons the horizon has few to common yellow, brown, or red mottles.

Candler Series

The Candler series consists of nearly level to gently sloping, excessively drained sandy soils that formed in thick beds of unconsolidated sandy marine, eolian, or fluvial sediment. The soils are in an area of sandhills on uplands. The water table is at a depth of more than 80 inches throughout the year. Slopes are smooth to concave and range from 0 to 5 percent. These soils are hyperthermic, uncoated Typic Quartzipsamments.

Candler soils are near Apopka, Pomello, Sparr, and Tavares soils. Apopka soils are in about the same position on the landscape as Candler soils but have an argillic horizon. Pomello, Sparr, and Tavares soils are in lower areas on the landscape. Sparr and Tavares soils have mottles (evidence of wetness) between depths of about 40 and 80 inches. Pomello soils have a Bh horizon between depths of 30 and 50 inches.

Typical pedon of Candler fine sand, 0 to 5 percent slopes, in a citrus grove, approximately 1.25 miles west of Bowling Green on County Highway 664 and north about 200 feet, SE1/4SE1/4NE1/4 sec. 6, T. 33 S., R. 25 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) fine sand; weak fine granular structure; very friable; many fine and medium roots; many uncoated sand grains; neutral; clear smooth boundary.

A21—7 to 19 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; many fine and medium roots and few large roots; many uncoated sand grains; strongly acid; clear wavy boundary.

A22—19 to 35 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; common fine and medium roots; many uncoated sand grains; strongly acid; clear wavy boundary.

A23—35 to 48 inches; yellow (10YR 7/6) fine sand; single grained; loose; few fine and medium roots; many uncoated sand grains; strongly acid; clear wavy boundary.

A24&B—48 to 66 inches; yellow (10YR 8/6) fine sand; single grained; loose; few roots; few yellowish brown (10YR 5/8) loamy fine sand lamellae about 1/16 to 1/8 inch thick and 1 to 4 inches long; many uncoated sand grains; strongly acid; gradual wavy boundary.

A25&B—66 to 80 inches; yellow (10YR 8/6) fine sand; few fine and medium distinct white (10YR 8/2) mottles; single grained; loose; few roots; yellowish brown (10YR 5/8) loamy fine sand lamellae about 1/16 to 1/8 inch thick and 1 to 4 inches long,

increasing in abundance with depth; sand grains in lamellae are well coated; strongly acid.

Candler soils are strongly acid or very strongly acid except in areas that have been limed.

The A1 or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is 2 to 8 inches thick. The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 3 through 6. Its texture is generally fine sand but ranges to sand.

The A24&B horizon is at a depth of 40 to 80 inches. It is less than 5 percent silt plus clay in the 10- to 40-inch control section.

The A2 part of the A2&B horizons has hue of 10YR, value of 7 or 8, and chroma of 1 to 6. Its texture is fine sand or sand. The B part of the A2&B horizons has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. Its texture is fine sand or loamy fine sand. The individual lamellae are 1 to 8 mm thick. The lamellae combined within a depth of 80 inches are generally 5 to 12 mm thick but range from 1 to 55 mm in thickness. In some pedons there are few to common small and large pockets of light gray (10YR 7/1, 7/2) and white (10YR 8/1, 8/2) uncoated sand grains in the A2 and A2&B horizons.

Cassia Series

The Cassia series consists of nearly level, somewhat poorly drained sandy soils that formed in thick deposits of marine sand. The soils are on low ridges slightly higher than the adjacent flatwoods. In most years, if the soils are not drained, the water table is at a depth of 15 to 40 inches for about 6 months and at a depth of more than 40 inches during dry periods. Slopes are 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Typic Haplohumods.

Cassia soils are near Immokalee, Jonathan, Myakka, Pomello, and Pomona soils. Immokalee, Myakka, and Pomona soils are poorly drained and are in slightly lower positions on the landscape than Cassia soils. Pomona soils have an argillic horizon. Jonathan soils are moderately well drained, are in higher positions on the landscape, and have a Bh horizon below a depth of 50 inches. Immokalee and Pomello soils have a Bh horizon between depths of 30 and 50 inches. Pomello soils are moderately well drained and are in higher positions on the landscape.

Typical pedon of Cassia fine sand, in a wooded area, 300 feet north of New Zion Baptist Church, 6 miles west of Ona, NE1/4NE1/4SW1/4 sec. 28, T. 34 S., R. 23 E.

A1—0 to 6 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; loose; many fine and medium roots; very strongly acid; abrupt wavy boundary.

A2—6 to 27 inches; white (N 8/0) sand; single grained; loose; many fine and medium roots; strongly acid; abrupt wavy boundary.

B21h—27 to 34 inches; dark reddish brown (5YR 3/2) sand; weak medium subangular blocky structure; friable; few fine and medium roots; approximately 30 percent slightly brittle to brittle material; very strongly acid; clear wavy boundary.

B22h—34 to 42 inches; dark brown (10YR 3/3) sand; single grained; loose; few and medium roots; very strongly acid; clear wavy boundary.

B31—42 to 57 inches; pale brown (10YR 6/3) sand; single grained; loose; few fine and medium roots; very strongly acid; clear wavy boundary.

B32&B'h—57 to 65 inches; dark grayish brown (10YR 4/2) sand; many medium, distinct black (10YR 2/1) very firm natural Bh fragments; single grained; loose; strongly acid; clear wavy boundary.

C—65 to 80 inches; dark brown (7.5YR 4/2) sand; single grained; loose; very strongly acid.

Cassia soils range from very strongly acid to medium acid.

The A1 horizon has no hue (N) or has hue of 10YR; value is 3 to 7, and chroma is 1 or 0. Unrubbed material has a salt-and-pepper appearance. The horizon is 2 to 6 inches thick.

The A2 horizon has no hue (N) or has hue of 10YR; value is 6 to 8, and chroma is 1 or 0. In some pedons there are gray, yellow, and brown mottles. In many pedons there is a transitional horizon 1/2 to 2 inches thick that has no hue (N) or has hue of 10YR; value is 2 through 4, and chroma is 2 or less. The A horizon ranges from 20 to 30 inches in thickness.

The Bh horizon has no hue (N) or has hue of 10YR, 7.5YR, or 5YR; value is 2 to 4, and chroma is 4 or less. Its texture is sand, fine sand, loamy fine sand, or loamy sand. The horizon ranges from 9 to 20 inches in thickness. The B3 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4.

The B32&B'h horizon has hue of 10YR, value of 2 through 4, and chroma of 2 or less. Its texture is sand, fine sand, or loamy fine sand. The A'2 horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. There is no A'2 horizon in some pedons.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 1 through 4. It has mottles in shades of gray, brown, and yellow in some pedons. Its texture is fine sand or sand.

Chobee Series

The Chobee series consists of nearly level, very poorly drained soils that formed in thick beds of unconsolidated, moderately fine marine sediment. These soils are in small to large depressions or in low, nearly level areas along the major streams throughout the

county. In most years the water table is above the surface for 6 to 9 months and is within 10 inches of the surface for most of the rest of the year except in very dry periods. The soils are subject to frequent flooding of long duration but do not receive appreciable sediment from the floodwaters. Slopes range from 0 to 2 percent. These soils are fine-loamy, siliceous, hyperthermic Typic Argiaquolls.

Chobee soils are near Bradenton, Felda, Holopaw, and Pompano soils, all of which do not have a mollic epipedon and are poorly drained. Felda soils have an argillic horizon at a depth between 20 and 40 inches. Bradenton soils are coarser textured in the argillic horizon than Chobee soils. Pompano soils do not have an argillic horizon.

Typical pedon of Chobee fine sandy loam, in an area of Bradenton-Felda-Chobee association, frequently flooded, in a pasture, 3 miles southwest of Ona, SE1/4SW1/4 sec. 12, T. 35 S., R. 23 E.

A1—0 to 8 inches; black (N 2/0) fine sandy loam; moderate medium granular structure; friable; many fine and medium roots; slightly acid; gradual wavy boundary.

B21tg—8 to 18 inches; black (10YR 2/1) sandy clay loam; weak coarse subangular blocky structure; friable; sand grains bridged and coated with clay; common fine roots; slightly acid; gradual wavy boundary.

B22tg—18 to 42 inches; very dark gray (10YR 3/1) sandy clay loam; common streaks of black (10YR 2/1); weak coarse subangular structure; friable; sand grains bridged and coated with clay; common fine roots; neutral; gradual wavy boundary.

B23tgca—42 to 55 inches; very dark gray (5Y 3/1) sandy loam; common fine distinct yellowish brown (10YR 5/6), brown (10YR 5/3), and black (10YR 2/1) streaks along root channels; common medium white (10YR 8/1) calcium carbonate nodules; weak coarse subangular blocky structure; friable; sand grains bridged and coated with clay; common medium roots; moderately alkaline; calcareous; clear wavy boundary.

Cg—55 to 80 inches; gray (5Y 5/1) loamy fine sand; common fine and medium faint dark grayish brown (10YR 4/2) mottles; massive; slightly sticky; few pockets of gray (N 5/0) and white (N 8/0) nodules of carbonates; moderately alkaline; calcareous.

The solum ranges from 40 to 80 inches or more in thickness. Base saturation is 50 percent or more in all horizons. The mollic epipedon is 10 to 24 inches thick.

The A horizon has no hue (N) or has hue of 10YR; the value is 2 or 3, and chroma is 1 or 0. Reaction ranges from slightly acid to neutral. The content of organic matter is about 5 to 20 percent. The A horizon is 3 to 18 inches thick.

The Btg and Btgca horizons have no hue (N) or have hues of 10YR to 5Y; the value is 2 through 6, and chroma is 1 or 0. Texture is sandy clay loam or sandy loam. The weighted average clay content of the 10- to 40-inch control section is 25 to 35 percent. Reaction ranges from slightly acid to moderately alkaline. In some pedons there are few to many mottles in shades of yellow or brown in these horizons.

The Cg horizon has no hue (N) or has hue of 10YR or 5Y; the value is 5 to 7, and chroma is 2 or less. Texture is loamy fine sand, sandy loam, or sandy clay loam that has pockets of coarser or finer textured material and carbonates. Reaction ranges from neutral to moderately alkaline.

Electra Series

The Electra series consists of nearly level, somewhat poorly drained soils that formed in unconsolidated loamy marine sediment. The soils are on upland ridges that have been partially drained by natural dissection. In most years, if the soils are not drained, the water table is at a depth of 25 to 40 inches for cumulative periods of 4 months and recedes to a depth of more than 40 inches during dry periods. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Arenic Ultic Haplohumods.

Electra soils are near Immokalee, Myakka, and Pomello soils. Immokalee and Myakka soils are poorly drained, and Pomello soils are moderately well drained. Unlike Electra soils, Immokalee, Myakka, and Pomello soils do not have an argillic horizon. Immokalee and Myakka soils are in lower positions on the landscape than Electra soils. Pomello soils are in about the same position on the landscape as Electra soils.

Typical pedon of Electra sand, in a pasture, 1.5 miles north of Wauchula airport, NE1/4SE1/4 sec. 26, T. 33 S., R. 25 E.

Ap—0 to 4 inches; gray (10YR 6/1) sand; weak medium granular structure; very friable; many fine roots; slightly acid; abrupt wavy boundary.

A21—4 to 16 inches; light gray (10YR 6/1) sand; single grained; loose; common fine and medium roots; sand grains are uncoated; neutral; gradual wavy boundary.

A22—16 to 42 inches; white (10YR 8/1) sand; single grained; loose; common fine and medium roots; sand grains are uncoated; neutral; abrupt irregular boundary.

B21h—42 to 45 inches; dark reddish brown (5YR 3/2) sand; weak medium granular structure; friable; few fine roots; sand grains coated with colloidal organic matter; 20 percent ortstein; medium acid; abrupt irregular boundary.

B22h—45 to 54 inches; dark reddish brown (5YR 3/3) sand; weak medium granular structure; friable; few fine roots; medium acid; gradual wavy boundary.

B23h—54 to 60 inches; dark brown (7.5YR 4/2) sand; weak medium granular structure; friable; medium acid; gradual wavy boundary.

B3&Bh—60 to 66 inches; gray (10YR 5/1) and dark brown (7.5YR 4/4) sand; single grained; loose; medium acid; abrupt smooth boundary.

B'21tg—66 to 72 inches; light brownish gray (2.5YR 6/2) fine sandy loam; many medium distinct strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; sand grains bridged and coated with clay; strongly acid; clear wavy boundary.

B'22tg—72 to 80 inches; light gray (5Y 7/2) fine sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; sand grains bridged and coated with clay; strongly acid.

Electra soils are very strongly acid or strongly acid except in areas that have been limed.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 2 or less. The horizon has a salt-and-pepper appearance. It is 2 to 6 inches thick.

The A2 horizon has no hue (N) or has hue of 10YR; the value is 5 to 8, and chroma is 2 or less. It is fine sand or sand. The A horizon ranges from 40 to 50 inches in thickness.

The Bh horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 to 4, and chroma of 1 to 3. It is sand or fine sand. Most sand grains are coated with organic matter. The horizon is about 10 to 18 inches thick.

The B3&Bh horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 1 through 4. It is fine sand or sand. It is 5 to 10 inches thick.

The A'2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 3. Its texture is fine sand or sand. There is no A'2 horizon in some pedons.

The B'tg horizon has hue of 10YR, value 5 to 7, and chroma of 1 or 2; or it has hue of 2.5Y or 5Y, value of 6 or 7, and chroma of 2 or 4 and has mottles in shades of gray, yellow, red, or brown. Its texture is sandy clay loam, sandy loam, or fine sandy loam. This horizon is at a depth of 41 to about 79 inches.

Farmton Series

The Farmton series consists of nearly level, poorly drained soils that formed in sandy marine sediment over loamy material. The soils are on low ridges and knolls in the flatwoods. In most years, if the soils are not drained, the water table is at a depth of 10 to 40 inches for periods of more than 6 months; it rises to within 10 inches of the surface for 1 to 3 months in wet seasons and recedes to a depth of more than 40 inches during extended dry periods. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Arenic Ultic Haplaquods.

Farmton soils are near Electra, Immokalee, Myakka, Ona, Pomona, Pomello, Wabasso, and Wauchula soils. Farmton soils have a Bh horizon at a depth of more than 30 inches; Myakka, Ona, Pomona, and Wabasso soils have a Bh horizon at a depth of less than 30 inches. Farmton soils have a Bt horizon at a depth of 40 to 76 inches; Immokalee, Ona, and Pomello soils do not have a Bt horizon. Farmton soils have a Bt horizon with base saturation of less than 35 percent; Wabasso soils have a Bt horizon with base saturation of more than 35 percent. Electra and Pomello soils are in higher positions on the landscape than Farmton soils.

Typical pedon of Farmton fine sand, in a pasture, on the Ben Hill Griffin Peace River Ranch, 4 miles south of Zolfo Springs, NW1/4NE1/4 sec. 16, T. 35 S., R. 25 E.

Ap—0 to 6 inches; black (10YR 2/1) fine sand, rubbed; weak fine crumb structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

A21—6 to 12 inches; dark gray (10YR 4/1) fine sand; single grained; loose; many fine and medium roots; strongly acid; clear smooth boundary.

A22—12 to 19 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine roots; strongly acid; clear wavy boundary.

A23—19 to 34 inches; white (10YR 8/1) fine sand; single grained; loose; few fine roots; medium acid; clear wavy boundary.

B21h—34 to 45 inches; very dark brown (10YR 2/2) fine sand; weak fine granular structure; very friable; many medium and coarse faint black (5YR 2/1) bodies; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

B3—45 to 55 inches; brown (10YR 4/3) fine sand; weak fine granular structure; very friable; few medium distinct black (5YR 2/1) bodies; few fine roots; very strongly acid; clear wavy boundary.

B'h—55 to 61 inches; black (5YR 2/1) fine sand; weak fine granular structure; very friable; sand grains coated with organic matter; very strongly acid; gradual wavy boundary.

B'21tg—61 to 71 inches; dark gray (5Y 4/1) fine sandy loam; weak coarse subangular blocky structure; firm; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

B'22tg—71 to 80 inches; mottled gray (5Y 5/1), olive (5Y 5/6), and greenish gray (5GY 6/1) sandy clay loam; massive in place, parting to weak fine subangular blocky structure; friable; sand grains coated and bridged with clay; extremely acid.

Farmton soils range from extremely acid to medium acid in all horizons.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 2 or less. If undisturbed, the horizon

has a salt-and-pepper appearance. It is 3 to 7 inches thick.

The A2 horizon has hue of 10YR, value of 4 to 8, and chroma of 2 or less. The A horizon is fine sand or sand. It ranges from 30 to 50 inches in thickness.

The Bh horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3, and chroma of 1 to 3. It ranges from 10 to 20 inches in thickness. Its texture is fine sand or sand.

The B3 horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. Its texture is fine sand or sand. It is 8 to 12 inches thick.

The B'h horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 to 5, and chroma of 3 or less. Its texture is fine sand. It is 3 to 6 inches thick.

The B'tg horizon has hue of 10YR, 5GY, 5Y, or 2.5Y, value of 4 to 7, and chroma of 1 to 6. Its texture is fine sandy loam, sandy loam, or sandy clay loam.

Felda Series

The Felda series consists of soils that formed in stratified, unconsolidated sandy and loamy marine sediment. The soils are in depressions, poorly defined drainageways, and low flat areas, on flood plains, and on side slopes adjacent to flood plains or depressions. In most years, if the soils are not drained, the water table is within 10 inches of the surface for 2 to 6 months. The soils in depressions are ponded for more than 6 months of the year. The soils on flood plains are frequently flooded. Slopes range from 0 to 2 percent. These soils are loamy, siliceous, hyperthermic Arenic Ochraqualfs.

The Felda soils are near Bradenton, Holopaw, Pomona, and Wabasso soils. Bradenton soils have an argillic horizon at a depth of less than 20 inches, and Holopaw soils have an argillic horizon between depths of 40 and 80 inches. Pomona and Wabasso soils have a spodic horizon.

Typical pedon of Felda fine sand, approximately 6.5 miles west of Fort Green Springs and 0.75 mile north of Florida State Highway 62, SW1/4SW1/4 sec. 17, T. 33 S., R. 23 E.

Ap—0 to 4 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; very friable; many fine and medium roots; mixture of organic matter and light gray sand grains has a salt-and-pepper appearance; very strongly acid; abrupt smooth boundary.

A21—4 to 11 inches; light brownish gray (10YR 6/2) sand; single grained; loose; many fine roots; many clean sand grains; very strongly acid; clear wavy boundary.

A22—11 to 21 inches; light gray (10YR 7/2) sand; few medium distinct brownish yellow (10YR 6/8) mottles; single grained; loose; few fine and medium roots; medium acid; clear wavy boundary.

A23—21 to 31 inches; light gray (10YR 7/2) sand; common medium distinct yellowish brown (10YR 5/8) mottles; single grained; loose; few fine and medium roots; slightly acid; abrupt wavy boundary.

B21tg—31 to 44 inches; light brownish gray (2.5Y 6/2) fine sandy loam; common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; clay bridging between sand grains; neutral; clear wavy boundary.

B22tg—44 to 58 inches; dark gray (5Y 4/1) fine sandy loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; clay bridging between sand grains; slightly acid; clear wavy boundary.

Cg—58 to 80 inches; gray (5Y 5/1) loamy sand; weak medium subangular blocky structure; firm; slightly acid.

The solum ranges from 30 to 60 inches in thickness. Reaction in the A horizon ranges from very strongly acid to neutral and in the B and C horizons from slightly acid to moderately alkaline.

The A1 or Ap horizon has no hue (N) or has hue of 10YR or 2.5Y; value is 2 to 5, and chroma is 2 or less. It is 3 to 6 inches thick.

The A2 horizon has no hue (N) or has hue of 10YR or 2.5Y; value is 4 through 7, and chroma is 2 or less. In some pedons there are few to common yellow or brown mottles in this horizon; in other pedons there are no mottles. The A horizon is fine sand or sand. It ranges from 20 to 40 inches in thickness.

The B2tg horizon has no hue (N) or has hue of 10YR, 5Y, or 2.5Y; value is 4 through 7, and chroma is 2 or less. It has brown, yellow, or red mottles. Its texture is sandy loam, fine sandy loam, or sandy clay loam. The average content of clay is 13 to 25 percent but ranges to 35 percent; the content of silt is less than 20 percent. The horizon ranges from 10 to 30 inches in thickness.

The Cg horizon has no hue (N) or has hue of 10YR, 5Y, or 5G; value is 4 through 8, and chroma is 2 or less. There are red, yellow, brown, and gray mottles in some pedons. The texture is sand, fine sand, or loamy sand. In some pedons there are few to many shell fragments; in other pedons there are no shell fragments.

Floridana Series

The Floridana series consists of nearly level, very poorly drained soils that formed in sandy and loamy marine sediment. The soils are in depressions. In most years, if the soils are not drained, they are covered by water for more than 6 months. Slopes are less than 2 percent. These soils are loamy, siliceous, hyperthermic Arenic Argiaquolls.

Floridana soils are near Basinger, Pompano, Popash, and Samsula soils. Basinger soils have an A&Bh horizon but do not have a mollic epipedon. Pompano soils are poorly drained and do not have a mollic epipedon or an

argillic horizon. Popash soils have an argillic horizon between depths of 40 and 80 inches. Samsula soils are organic.

Typical pedon of Floridana mucky fine sand, depressional, in a grassy depression, 5 miles south of Crewsville and 1.5 miles west of the Hardee County line, SW1/4SW1/4SE1/4 sec. 14, T. 36 S., R. 27 E.

A11—0 to 4 inches; black (N 2/0) mucky fine sand; weak fine granular structure; friable; many fine and few medium roots; sand grains coated with organic material; medium acid; clear wavy boundary.

A12—4 to 15 inches; very dark gray (10YR 3/1) fine sand; many fine and few coarse gray (10YR 5/1) pockets of uncoated sand; weak fine granular structure; very friable; many fine and few medium roots; slightly acid; clear wavy boundary.

A2—15 to 32 inches; gray (10YR 6/1) fine sand; common coarse distinct very dark gray (10YR 3/1) mottles; single grained; loose; common medium roots; slightly acid; clear wavy boundary.

B2tg—32 to 44 inches; dark gray (10YR 4/1) sandy clay loam; common coarse faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; slightly plastic; common fine and medium roots; sand grains coated and bridged with clay; mildly alkaline; gradual wavy boundary.

B31g—44 to 65 inches; gray (2.5Y 6/1) sandy loam; common medium faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; common medium lenses and pockets of light gray (10YR 7/1) loamy fine sand and fine sand; many uncoated sand grains; mildly alkaline; gradual wavy boundary.

B32g—65 to 80 inches; light gray (N 7/0) sandy loam; common fine and medium white (N 8/0) mottles; massive; friable; common medium and coarse lenses and pockets of fine sand and loamy fine sand; mildly alkaline.

Floridana soils range from medium acid to mildly alkaline in all horizons.

The A1 horizon has no hue (N) or has hue of 10YR or 2.5Y; the value is 3 or less, and chroma is 2 or less. The A1 horizon is 10 to 16 inches thick. Texture is mucky fine sand in the A11 horizon and sand or fine sand in the A12 horizon. The A2 horizon has no hue (N) or has hue of 10YR or 2.5Y; the value is 4 through 7, and chroma is 2 or less. There are few to common mottles in the A2 horizon. The texture is fine sand or sand. The A1 and A2 horizons combined range from 20 to 40 inches in thickness.

The Btg and Bg horizons have no hue (N) or have hue of 10YR or 2.5Y; the value is 4 through 7, and chroma is 2 or less. In some pedons the horizons have gray, yellow, or brown mottles. Their texture is sandy loam or sandy clay loam. In some pedons there are pockets of sand, fine sand, or loamy fine sand. The content of clay ranges from 14 to 30 percent but generally is 16 to 23 percent.

Ft. Green Series

The Ft. Green series consists of gently sloping, poorly drained soils that formed in stratified, unconsolidated sandy and loamy marine sediment. The soils are on side slopes adjacent to flood plains or depressions. In most years, if the soils are not drained, the water table is within 10 inches of the surface for 1 to 4 months. Slopes are from 2 to 5 percent. These soils are loamy, siliceous, hyperthermic Arenic Ochraqualfs.

Ft. Green soils are near Bradenton, Holopaw, Pomona, and Wabasso soils. Bradenton soils have an argillic horizon at a depth of less than 20 inches, and Holopaw soils have an argillic horizon between depths of 40 and 80 inches. Pomona and Wabasso soils are in about the same position on the landscape as Ft. Green soils and have a spodic horizon.

Typical pedon of Ft. Green fine sand, 2 to 5 percent slopes, in a pasture, approximately 4 miles west of Wauchula, 0.5 mile east of County Highway 64A, SE1/4SE1/4 sec. 24, T. 34 S., R. 24 E.

Ap—0 to 6 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; very friable; many fine and medium roots; medium acid; clear smooth boundary.

A21—6 to 17 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; many fine and medium roots; many uncoated sand grains; medium acid; gradual wavy boundary.

A22—17 to 31 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; common fine and medium roots; 10 to 15 percent cobbles; strongly acid; abrupt wavy boundary.

B21tg—31 to 42 inches; light gray (10YR 7/1) cobbly sandy clay loam; massive parting to weak medium granular structure; friable; strongly acid; abrupt wavy boundary.

B22tg—42 to 52 inches; light gray (10YR 7/1) sandy clay loam; massive parting to weak coarse subangular blocky structure; firm; medium acid; abrupt wavy boundary.

B23tg—52 to 80 inches; light gray (5Y 7/1) fine sandy loam; massive parting to weak coarse subangular blocky structure; firm; strongly acid.

The A horizon is strongly acid to neutral, and the B horizon is medium acid to neutral.

The A1 or Ap horizon has no hue (N) or has hue of 10YR or 2.5Y; the value is 2 to 5, and chroma is 2 or less. It is 3 to 7 inches thick.

The A2 horizon has no hue (N) or has hue of 10YR or 2.5Y; the value is 4 to 7, and chroma is 2 or less. In some pedons there are few to common yellow or brown

mottles; in other pedons there are no mottles. In the lower part the horizon is fine sand, sand, or cobbly fine sand. The A horizon ranges from 20 to 40 inches in thickness.

The B2tg horizon has no hue (N) or has hue of 10YR, 5Y, or 2.5Y; the value is 4 to 7, and chroma is 2 or less. In some pedons it has brown, yellow, or gray mottles. Its texture in the upper part is cobbly fine sandy loam or cobbly sandy clay loam and in the lower part is fine sandy loam or sandy clay loam. The horizon extends to a depth of more than 80 inches.

Holopaw Series

The Holopaw series consists of nearly level, poorly drained soils that formed in stratified, unconsolidated marine sand and sandy clay loam. The soils are on broad, low-lying flats and in poorly defined drainageways. In most years, if the soils are not drained, the water table rises to within 10 inches of the surface for 2 to 6 months. Slopes range from 0 to 2 percent. These soils are loamy, siliceous, hyperthermic Grossarenic Ochraqualfs.

Holopaw soils are near Bradenton, Felda, and Pomona soils. Bradenton soils have a sandy loam Btg horizon within 20 inches of the surface. Felda soils have a sandy A horizon 20 to 40 inches thick. Pomona soils have a spodic horizon.

Typical pedon of Holopaw fine sand, in a wooded area, approximately 300 feet west of Polk Road NW and approximately 0.5 mile south of the intersection of Old Bradenton Road NW and Polk Road NW, NE1/4SW1/4SE1/4 sec. 30, T. 33 S., R. 25 E.

A1—0 to 3 inches; black (10YR 2/1) fine sand; weak fine crumb structure; friable; many fine roots; slightly acid; clear smooth boundary.

A21—3 to 8 inches; light gray (10YR 7/2) fine sand; single grained; loose; common fine roots; slightly acid; clear smooth boundary.

A22—8 to 24 inches; pale brown (10YR 6/3) fine sand; single grained; loose; few fine roots; slightly acid; clear smooth boundary.

A23g—24 to 63 inches; light gray (10YR 7/2) fine sand; single grained; loose; neutral; clear smooth boundary.

B2tg—63 to 70 inches; gray (5Y 6/1) sandy loam; weak medium subangular blocky structure; firm clay bridging between sand grains; moderately alkaline; gradual wavy boundary.

B3g—70 to 80 inches; gray (5Y 6/1) sandy loam; massive; firm; moderately alkaline.

The solum ranges from 50 to 80 inches in thickness. Reaction ranges from slightly acid to moderately alkaline throughout.

The A1 or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 2 or less. The A2 horizon has hue of 10YR or 2.5Y; value is 4 to 7; and within a depth of 30 inches chroma is 3 or less, but below a depth of 30 inches it is 2 or less. There are mottles in shades of yellow and brown in some pedons. The A horizon ranges from 40 to 72 inches in thickness.

The B2tg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 2 or less. There are mottles in shades of brown or yellow in some pedons. Texture is sandy loam or sandy clay loam. The horizon commonly has pockets and lenses of sand.

The B3g horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 2 or less. It has mottles in shades of brown or yellow. Its texture is sandy loam or loamy sand. In many pedons the horizon has pockets of sandy clay loam and lenses of sand.

The C horizon has no hue (N) or has hue of 10YR or 2.5Y; the value is 5 to 7, and chroma is 2 or less. Its texture is sand, fine sand, or loamy fine sand. There is no C horizon in some pedons.

Hontoon Series

The Hontoon series consists of very poorly drained, nearly level organic soils in swampy areas that range from 3 to 40 acres in size. The water table is at or above the surface except during extended dry periods. Slopes are dominantly less than 1 percent but range to 2 percent. These soils are dysic, hyperthermic Typic Medisaprists.

Hontoon soils are near Placid, Myakka, and Samsula soils. Placid and Myakka soils are on higher lying convex ridges and are mineral soils. Samsula soils are at the outer edge of the swamp and, unlike Hontoon soils, have an organic layer less than 51 inches thick.

Typical pedon of Hontoon muck, in a wooded area, approximately 0.75 mile south of junction of County Highways 663A and 663, 300 feet east of County Highway 663, NW1/4SW1/4 sec. 28, T. 35 S., R. 24 E.

Oa1—0 to 36 inches; black (10YR 2/1) muck, unrubbed and rubbed; about 5 percent fiber; weak fine granular structure; friable; many fine roots; very dark grayish brown (10YR 3/2) sodium pyrophosphate extract; extremely acid in 0.01*M* calcium chloride; clear wavy boundary.

Oa2—36 to 50 inches; black (N 2/0) muck, unrubbed and rubbed; weak fine granular structure; friable; few fine roots; dark yellowish brown (10YR 3/4) sodium pyrophosphate extract; extremely acid in 0.01*M* calcium chloride; clear wavy boundary.

Oa3—50 to 56 inches; dark reddish brown (5YR 3/3) muck, unrubbed and rubbed; about 5 percent fiber; massive; friable; dark reddish brown (5YR 3/2) extract; extremely acid in 0.01*M* calcium chloride; clear wavy boundary.

Oa4—56 to 60 inches; black (N 2/0) muck; massive; friable; dark grayish brown (10YR 4/2) extract;

extremely acid in 0.01*M* calcium chloride; abrupt wavy boundary.

IIC1g—60 to 70 inches; dark gray (10YR 4/1) loamy fine sand; massive; friable; very strongly acid; gradual wavy boundary.

IIC2g—70 to 80 inches; dark gray (10YR 4/1) fine sandy loam; massive, friable; very strongly acid.

Reaction is less than pH 4.5 in 0.01*M* calcium chloride. The IICg horizon is extremely acid or very strongly acid by the Hellige-Truog method. The O horizon is muck or mucky peat. The organic material is 51 inches thick or more.

The Oa horizon has no hue (N) or has hue of 10YR or 5YR; the value is 0 to 3, and chroma is 0 to 3. The content of fiber when the material is unrubbed is less than 30 percent, and when the material is rubbed the content is less than 15 percent. Sodium pyrophosphate extract of the Oa horizon has hue of 10YR, value of 2 to 4, and chroma of 4 or less.

The IICg horizon has no hue (N) or has hue of 10YR or 2.5Y; the value is 2 to 5, and chroma is 2 or less. Its texture is fine sand, sand, loamy fine sand, fine sandy loam, or sandy clay loam.

Immokalee Series

The Immokalee series consists of poorly drained, nearly level soils that formed in thick beds of marine sand deposits. The soils are on broad low ridges and low knolls in the flatwoods. In most years, if the soils are not drained, the water table is at a depth of 10 to 40 inches for more than 8 months; it is at a depth of less than 10 inches for 2 months and at a depth of more than 40 inches during dry periods. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Arenic Haplaquods.

Immokalee soils are near Adamsville, Jonathan, Myakka, and Pomello soils. Adamsville soils are in about the same position on the landscape as Immokalee soils but are better drained and do not have a Bh horizon. Jonathan and Pomello soils are in higher positions on the landscape and are better drained than Immokalee soils. Jonathan soils have a Bh horizon at a depth of more than 50 inches. Myakka soils are in similar positions on the landscape but have a Bh horizon at a depth of less than 30 inches.

Typical pedon of Immokalee fine sand, in a pasture, 4 miles northeast of Wauchula, 600 feet east of County Highway 636, NW1/4NW1/4NW1/4 sec. 24, T. 33 S., R. 25 E.

A1—0 to 5 inches; very dark gray (10YR 3/1) fine sand; mixture of organic matter and light gray sand grains has a salt-and-pepper appearance when dry; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

A21—5 to 11 inches; gray (10YR 5/1) fine sand; single grained; loose; many fine and medium roots; very strongly acid; gradual smooth boundary.

A22—11 to 44 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine vertical streaks of gray and very dark gray; few medium roots; very strongly acid; clear smooth boundary.

B21h—44 to 48 inches; black (5YR 2/1) fine sand; weak fine granular structure; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

B22h—48 to 60 inches; dark reddish brown (5YR 2/1) fine sand; single grained; loose; common fine and medium dark reddish brown (5YR 3/3) weakly cemented fragments; sand grains coated with organic matter; very strongly acid; gradual wavy boundary.

B3—60 to 80 inches; dark reddish brown (5YR 3/4) fine sand; single grained; loose; very strongly acid.

The solum ranges from 60 to 80 inches in thickness. Reaction ranges from medium acid to very strongly acid in all horizons. Texture is sand or fine sand throughout.

The A1 or Ap horizon has no hue (N) or has hue of 10YR; the value is 2 or 3, and chroma is 2 or less. It is 3 to 8 inches thick.

The A2 horizon has no hue (N) or has hue of 10YR or 2.5Y; the value is 5 to 8, and chroma is 2 or less. In some pedons it has a few gray, yellow, brown, and red mottles. Commonly, there is a transitional horizon 1/2 to 2 inches thick between the A and B horizons. The A2 horizon ranges from 30 to 44 inches in thickness.

The Bh horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 3 or less. It ranges from 12 to 28 inches in thickness.

In some pedons there is a second sequum of A'2 and B'2 horizons. The A'2 horizon has the same color range as the A2 horizon, and the B'2 horizon has the same color range as the Bh horizon.

The B3 horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 to 5, and chroma of 3 or 4. In some pedons there is a B3&Bh horizon that has matrix colors similar to the colors of the B3 horizon. It has medium and coarse weakly cemented fragments that are dark reddish brown and black. The B3 or B3&h horizon ranges from 10 to 30 inches in thickness.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 2 to 4. It has few to common brown, yellow, or gray mottles throughout. It ranges from 0 to 15 inches in thickness. There is no C horizon in some pedons.

Jonathan Series

The Jonathan series consists of moderately well drained to somewhat excessively drained, nearly level soils that formed in thick deposits of marine sand. The soils are on low ridges in the flatwoods. In most years, if

the soils are not drained, the water table may rise for brief periods to a depth of 36 inches but is usually at a depth of 40 to 60 inches for 1 to 4 months during the wet season; it is below a depth of 60 inches for the rest of the year. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic, ortstein Typic Haplohumods.

Jonathan soils are near Cassia, Myakka, and Pomello soils. Cassia and Myakka soils have a Bh horizon at a depth of less than 30 inches. Cassia soils are somewhat poorly drained, and Myakka soils are poorly drained. Pomello soils have a Bh horizon between depths of 30 and 50 inches.

Typical pedon of Jonathan sand, in an area of sand scrub, approximately 6.5 miles west of Ona, north on Owen Roberts Road, SW1/4SW1/4 sec. 17, T. 34 S., R. 23 E.

A1—0 to 6 inches; very dark gray (10YR 3/1) sand, rubbed; salt-and-pepper appearance, unrubbed; weak fine granular structure; friable; many fine and medium roots; strongly acid; clear smooth boundary.
A21—6 to 21 inches; gray (10YR 6/1) sand; single grained; loose; many fine and medium roots; medium acid; clear wavy boundary.
A22—21 to 45 inches; light gray (10YR 7/1) fine sand; single grained; loose; many fine and medium roots; medium acid; clear wavy boundary.
A23—45 to 64 inches; white (10YR 8/1) fine sand; single grained; loose; many fine and medium roots; strongly acid; abrupt wavy boundary.
B21h—64 to 69 inches; dark reddish brown (5YR 2/1) loamy fine sand; massive; very firm; weakly cemented; extremely acid; clear wavy boundary.
B22h—69 to 80 inches; black (10YR 2/1) loamy fine sand; massive; very firm; weakly cemented; extremely acid.

Jonathan soils range from very strongly acid to medium acid in the A horizon and from extremely acid to very strongly acid in the Bh horizon. They are sand or fine sand in the A horizon and are sand, fine sand, loamy fine sand, or loamy sand in the Bh horizon.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. When unrubbed it has a salt-and-pepper appearance. It is 2 to 6 inches thick. The A2 horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. The A horizon ranges from 51 to 75 inches in thickness.

The Bh horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3; and chroma of 1 to 3. It is 20 to 26 inches thick. The B3 horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4. There is no B3 horizon in some pedons. The B3&Bh horizon has the same matrix colors that the B3 horizon has and has darker colored, firm Bh fragments. There is no B3&Bh horizon in some pedons.

Kaliga Series

The Kaliga series consists of nearly level, very poorly drained soils that formed in well decomposed organic matter and in the underlying sandy and loamy marine sediment. The soils are in low depressions. In most years, if the soils are not drained, the water table is at or near the surface for 6 to 12 months and usually is above the surface for very long periods. Slopes are less than 2 percent. These soils are loamy, siliceous, dysic, hyperthermic Terric Medisaprists.

Kaliga soils are near Bradenton, Felda, Holopaw, and Pomona soils, which are mineral soils and which are in higher positions on the landscape.

Typical pedon of Kaliga muck, in a pasture, 1.25 miles north of State Highway 64 and approximately 0.5 mile west of Smith Ranch; SE1/4SW1/4 sec. 14, T. 33 S., R. 27 E.

Oa—0 to 25 inches; black (10YR 2/1) muck, unrubbed and rubbed; about 10 percent fiber, 5 percent when rubbed; moderate medium crumb structure; very friable; many fine roots; sodium pyrophosphate brown (10YR 5/3); extremely acid, pH 3.4 in 0.01*M* calcium chloride; clear smooth boundary.
IIC1—25 to 35 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; friable; strongly acid; clear wavy boundary.
IIC2—35 to 60 inches; dark gray (10YR 4/1) sandy clay loam; moderate medium subangular blocky structure; very firm; few fine roots; neutral; clear wavy boundary.
IIC3—60 to 80 inches; very dark gray (10YR 3/1) fine sandy loam; massive; firm; neutral.

The Oa horizon has no hue (N) or has hue of 7.5YR or 10YR; the value is 2 or 3, and chroma is 3 or less. The content of unrubbed fiber is 10 to 30 percent, and that of rubbed fiber is less than 5 percent. Reaction is extremely acid or very strongly acid by the Hellige-Truog field test or is less than pH 4.5 in 0.01*M* solution of calcium chloride. The organic material ranges from 16 to 50 inches in thickness but on the average is 25 to 30 inches thick.

The IIC horizon has hue of 10YR, value of 3 or 4, and chroma of 1. The IIC1 horizon is fine sand, loamy fine sand, or fine sandy loam; the IIC2 horizon is sandy loam or sandy clay loam; and the IIC3 horizon is fine sandy loam or sandy clay loam. The IIC1 horizon is 8 to 12 inches thick. Reaction in the IIC horizon is neutral to strongly acid.

Manatee Series

The Manatee series consists of very poorly drained, moderately permeable soils that formed in sandy and loamy marine sediment. The soils are in depressions. In

most years, if the soils are not drained, they are covered by shallow water for more than 6 months. Slopes are dominantly less than 1 percent but range to 2 percent. These soils are coarse-loamy, siliceous, hyperthermic Typic Argiaquolls.

Manatee soils are near Bradenton, Felda, Floridana, Holopaw, and Kaliga soils. Bradenton soils do not have a mollic epipedon. Felda soils do not have a mollic epipedon but have an argillic horizon within a depth of 20 to 40 inches. Floridana soils have an argillic horizon between depths of 20 and 40 inches. Holopaw soils have a sandy epipedon more than 40 inches thick. Kaliga soils are organic soils.

Typical profile of Manatee mucky fine sand, depressional, in an area of cypress trees, 1.125 miles east of Parnell Road and 4.5 miles north of State Highway 64, SW1/4NE1/4 sec. 16, T. 34 S., R. 27 E.

A11—0 to 4 inches; black (10YR 2/1) mucky fine sand; moderate fine and medium granular structure; friable; many fine and medium roots; 10 to 15 percent organic matter; medium acid; gradual wavy boundary.

A12—4 to 9 inches; black (10YR 2/1) fine sand; moderate fine granular structure; very friable; many fine and medium roots; medium acid; gradual wavy boundary.

A13—9 to 14 inches; very dark grayish brown (10YR 3/2) loamy fine sand, unrubbed; very dark gray (10YR 3/1), rubbed; moderate fine granular structure; friable; many fine and medium roots; slightly acid; clear wavy boundary.

B21t—14 to 30 inches; dark gray (10YR 4/1) sandy loam; few small pockets of fine sand; weak medium subangular blocky structure; friable; many fine and medium roots; moderately alkaline; clear wavy boundary.

B22tg—30 to 44 inches; grayish brown (10YR 5/2) sandy loam; pockets of fine sand; moderate medium subangular blocky structure; friable; common fine and medium roots; moderately alkaline; gradual wavy boundary.

C1g—44 to 64 inches; light brownish gray (2.5Y 6/2) sandy loam; massive; slightly sticky; slightly plastic; moderately alkaline; clear wavy boundary.

C2g—64 to 80 inches; light gray (5Y 6/1) sandy clay loam; massive; sticky; moderately alkaline.

Manatee soils range from medium acid to mildly alkaline in the A horizon and from neutral to moderately alkaline in the B and C horizons.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 12 to 20 inches thick.

The B21t horizon has hue of 10YR, value of 2 to 7, and chroma of 1 or 2. Its texture is fine sandy loam, sandy loam, or loamy sand.

The B22tg horizon has hue of 10YR or 5Y, value of 4 to 7, and chroma of 1 or 2. Its texture is fine sandy loam, sandy loam, or sandy clay loam.

The C horizon has hue of 2.5 or 5Y, value of 4 to 7, and chroma of 1 or 0. Its texture is sandy clay loam or sandy loam.

Myakka Series

The Myakka series consists of nearly level, poorly drained, deep sandy soils in broad areas of flatwoods. Slopes are less than 2 percent. In most years, if the soils are not drained, the water table is at a depth of less than 10 inches for 1 to 4 months and recedes to a depth of more than 40 inches during very dry seasons. These soils are sandy, siliceous, hyperthermic Aeric Haplaquods.

Myakka soils are near Adamsville, Basinger, Pomona, Pompano, and Wauchula soils. Adamsville soils are on slightly higher ridges on the landscape. Unlike Myakka soils, they are somewhat poorly drained and do not have a Bh horizon. Basinger and Pompano soils are in about the same position on the landscape as Myakka soils but do not have a spodic horizon. Pomona and Wauchula soils have an argillic horizon below a spodic horizon.

Typical pedon of Myakka fine sand, in a pasture, on the Ona Range Cattle Experiment Station, pasture no. 74, 1,400 feet north of drainage canal and 100 feet west of Highway 663, NE1/4NW1/4 sec. 33, T. 35 N., R. 24 E.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sand, crushed; salt-and-pepper appearance, uncrushed; weak fine crumb structure; very friable; matted with many fine and medium roots; extremely acid; clear smooth boundary.

A2—6 to 21 inches; light gray (10YR 7/2) fine sand; common fine vertical dark gray streaks along root channels; single grained; loose; common fine and medium roots; strongly acid; abrupt wavy boundary.

B21h—21 to 25 inches; very dark gray (5YR 3/1) fine sand; weak medium subangular blocky structure; friable; many fine and medium roots; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

B22h—25 to 30 inches; dark reddish brown (5YR 3/4) fine sand; weak medium subangular blocky structure; friable; many fine and medium roots; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

B3&Bh—30 to 40 inches; brown (10YR 4/3) fine sand; weak fine granular structure; very friable; few fine roots; few medium distinct dark brown (7.5YR 3/2) bodies; very strongly acid; clear wavy boundary.

B3—40 to 46 inches; brown (7.5YR 5/4) fine sand; single grained; loose; few small pieces of ironstone; very strongly acid; clear wavy boundary.

C1—46 to 54 inches; pale brown (10YR 6/3) fine sand; single grained; loose; common medium distinct red (2.5YR 4/6) bodies; a few small pieces of ironstone; very strongly acid; gradual wavy boundary.
C2—54 to 80 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; strongly acid.

Myakka soils range from extremely acid to slightly acid throughout. They are fine sand or sand except in the A1 horizon, where they are fine sand.

The A1 horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. Uncrushed, the material is a mixture of white sand grains and black organic material that has a salt-and-pepper appearance. The A1 horizon is 4 to 8 inches thick. The A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. In some pedons it has gray, brown, and yellow mottles. The A horizon ranges from 20 to 30 inches in thickness.

The B2h horizon has hue of 5YR, value of 2 or 3, and chroma of 4 or less; or it has hue of 7.5YR or 10YR, chroma of 3 or less, and value of 2 or less. The B3&Bh horizon has hue of 5YR, value of 2 or 3, and chroma of 4 or less; or it has hue of 7.5YR or 10YR, value of 3 to 7, and chroma of 2 through 4. The B3 horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 through 4.

The C horizon has hue of 10YR, value of 4 through 7, and chroma of 1 through 4.

Ona Series

The Ona series consists of nearly level, poorly drained soils that formed in sandy marine sediment in broad areas of flatwoods. Unless artificially drained the soils are saturated in the normal wet seasons. Slopes generally are less than 2 percent. In most years, if the soils are not drained, the water table is at a depth of 10 to 40 inches for periods of 4 to 6 months; it rises to a depth of less than 10 inches for periods of 1 to 2 months and may recede to a depth of more than 40 inches in very dry seasons. These soils are sandy, siliceous, hyperthermic Typic Haplaquods.

Ona soils are near Immokalee, Myakka, Pomello, and Pompano soils. Unlike Ona soils, Immokalee, Myakka, and Pomello soils typically have a leached horizon. Pompano soils do not have a Bh horizon.

Typical pedon of Ona fine sand, in a pasture, on the Ona Range Cattle Experimental Station, 4.75 miles south of Ona on State Highway 663, 400 feet west on Goose Pond Road, NE1/4NW1/4 sec. 28, T. 35 S., R. 24 E.

Ap—0 to 4 inches; black (10YR 2/1) fine sand; moderate fine crumb structure; friable; many fine roots; strongly acid; clear smooth boundary.
A12—4 to 9 inches; black (10YR 2/1) fine sand, crushed; weak fine granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.
Bh—9 to 16 inches; dark reddish brown (5YR 2/2) loamy fine sand; weak coarse blocky structure; friable; common fine roots; strongly acid; gradual wavy boundary.
C1—16 to 24 inches; brown (10YR 5/3) fine sand; single grained; loose; common fine roots; medium acid; gradual wavy boundary.
C2—24 to 42 inches; pale brown (10YR 6/3) fine sand; single grained; loose; common fine roots; slightly acid; clear wavy boundary.
C3—42 to 60 inches; light gray (10YR 7/2) fine sand; common medium distinct brownish yellow (10YR 6/6) mottles; single grained; loose; slightly acid; clear wavy boundary.
C4—60 to 80 inches; brown (7.5YR 4/2) fine sand; single grained; loose; medium acid.

Ona soils range from slightly acid to extremely acid throughout. They are sand or fine sand in the A and C horizons and sand, fine sand, or loamy fine sand in the Bh horizon.

The A1 or Ap horizon has no hue (N) or has hue of 10YR, value of 2 or 3, and chroma of 2 or less. It is 4 to 8 inches thick. In some pedons an A2 horizon about 2 inches thick separates the Ap or A1 and the Bh horizons.

The Bh horizon has no hue (N) or has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 3 or less. It ranges from 6 to 20 inches in thickness. The B3 horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. It ranges from 10 to 38 inches in thickness.

The B'h horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 3 or less. It ranges from 12 to 33 inches in thickness. There is no B'h horizon in some pedons.

The C horizon has hue of 10YR through 2.5Y, value of 5 through 8, and chroma of 2 through 4. In some pedons it has few to common mottles of brown, yellow, or gray.

Placid Series

The Placid series consists of deep, very poorly drained acid soils that formed in thick beds of marine deposits. The soils are in wet depressions in the flatwoods. In most years the water table is at a depth of less than 10 inches for more than 6 months, and most depressions are covered by water for 6 months or more. Slopes are less than 2 percent. These soils are sandy, siliceous, hyperthermic Typic Humaquepts.

Placid soils are near Basinger, Myakka, Pompano, and Samsula soils. Basinger and Pompano soils are in about the same position on the landscape as Placid soils but are poorly drained and do not have a thick, dark colored A horizon. Myakka soils are on low ridges and in higher positions on the landscape and have a spodic horizon.

Samsula soils are at lower elevations on the landscape and are organic soils.

Typical pedon of Placid fine sand, depressional, in an area of pasture, 3.8 miles south of Sweetwater on Fish Branch Road, 200 feet east of road, NE1/4SE1/4 sec. 9, T. 36 S., R. 26 E.

A11—0 to 6 inches; black (10YR 2/1) fine sand; moderate medium crumb structure; friable; many fine and medium roots; about 10 percent organic matter; very strongly acid; gradual smooth boundary.

A12—6 to 18 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.

C1—18 to 52 inches; grayish brown (10YR 5/2) fine sand; few fine distinct dark brown (10YR 4/3) mottles; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

C2—52 to 80 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; strongly acid.

Placid soils are fine sand, sand, loamy fine sand, or loamy sand throughout. They are extremely acid through strongly acid in all horizons.

The A horizon is 10 to 20 inches thick in more than half of the pedons, but the range is 10 to 24 inches. The horizon has no hue (N) or has hue of 10YR, value of 2 or 3, and chroma of 2 or less.

The C horizon has no hue (N) or has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 or less. In some pedons it has a few fine mottles in shades of yellow, red, and brown. In some pedons it has a few discontinuous vertical black streaks.

Pomello Series

The Pomello series consists of nearly level, moderately well drained sandy soils that formed in thick deposits of marine sand. The soils are on low ridges in the flatwoods. In most years, if the soils are not drained, the water table is at a depth of 24 to 40 inches for 1 to 4 months and is at a depth of 40 to 60 inches for 8 months. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Arenic Haplohumods.

Pomello soils are near Cassia, Jonathan, and Myakka soils. Cassia and Myakka soils have a Bh horizon within a depth of 30 inches. In addition, Cassia soils are somewhat poorly drained, and Myakka soils are poorly drained. Jonathan soils have a Bh horizon at a depth of more than 50 inches.

Typical pedon of Pomello fine sand (fig. 8), in a pasture, approximately 1,500 feet west of County Highway 664B and 300 feet north of Reynolds Road, NW1/4NE1/4 sec. 23, T. 33 S., R. 25 E.

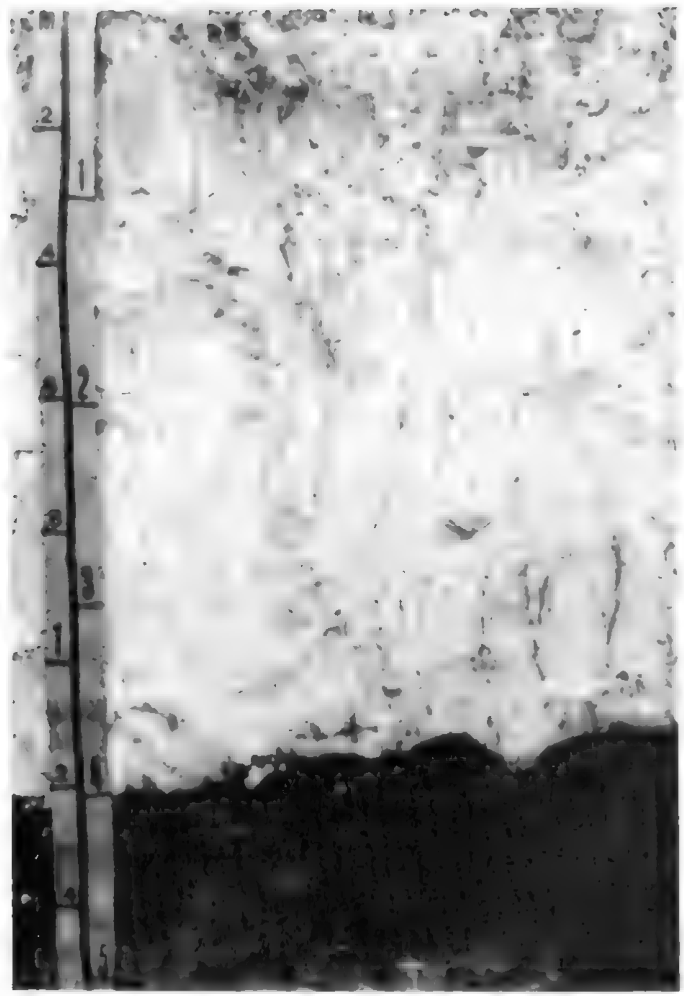


Figure 8.—Pomello fine sand has a dark colored subsoil at a depth of about 48 inches. Depth is shown in meters and feet.

Ap—0 to 5 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; common fine roots; very strongly acid; abrupt smooth boundary.

A21—5 to 15 inches; gray (10YR 6/1) fine sand; single grained; loose; common fine roots; strongly acid; clear wavy boundary.

A22—15 to 46 inches; white (10YR 8/1) fine sand; single grained; loose; common fine roots; medium acid; clear wavy boundary.

B2h—46 to 58 inches; black (10YR 2/1) fine sand; masses of dark reddish brown (5YR 3/2); weak coarse subangular blocky structure; very friable; sand grains coated with organic matter; very strongly acid; clear smooth boundary.

A'2—58 to 66 inches; gray (10YR 6/1) fine sand; single grained; loose; very strongly acid; clear wavy boundary.

B'h—66 to 80 inches; black (5YR 2/1) fine sand; massive parting to weak fine granular structure; very

friable; sand grains coated with organic matter; extremely acid.

Pomello soils range from very strongly acid to medium acid. They are sand or fine sand throughout.

The Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. When unrubbed it has a salt-and-pepper appearance. The horizon is 2 to 6 inches thick.

The A2 horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. It is 30 to 48 inches thick.

The Bh horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 1 through 3. It ranges from 10 to 20 inches in thickness.

The B3 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 or 4. There is no B3 horizon in some pedons.

The A'2 horizon has hue of 10YR, value of 5 through 7, and chroma of 2 or less. It is 6 to 12 inches thick.

The B'h horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 1 through 3. It is 10 to 20 inches thick.

Pomona Series

The Pomona series consists of nearly level, poorly drained sandy soils that formed in sandy and loamy marine deposits. The soils are in broad areas of flatwoods. In most years, if the soils are not drained, the water table is at a depth of 10 inches for 1 to 3 months and at a depth of less than 40 inches for more than 6 months. Slopes are less than 2 percent. These soils are sandy, siliceous, hyperthermic Ultic Haplaquods.

Pomona soils are near Basinger, Floridana, Myakka, Popash, and Wauchula soils. Floridana and Popash soils have a mollic epipedon and generally are in depressions in the flatwoods. Basinger soils do not have a spodic horizon or an argillic horizon. Wauchula soils have an argillic horizon within 40 inches of the surface.

Typical pedon of Pomona fine sand (fig. 9), in a pasture, on the Range Cattle Experiment Station, 1.5 miles west of State Highway 663 on Goose Pond Road, and 1,000 feet south on Experiment Station Road, NW1/4NW1/4 sec. 29, T. 35 S., R. 24 E.

A1—0 to 3 inches; black (10YR 2/1) fine sand; weak fine granular structure; loose; few coarse and many fine and medium roots; extremely acid; clear smooth boundary.

A21—3 to 10 inches; gray (10YR 5/1) fine sand; single grained; loose; few coarse and many fine and medium roots; very strongly acid; clear smooth boundary.

A22—10 to 27 inches; light gray (10YR 7/1) fine sand; single grained; loose; many fine and medium roots; very strongly acid; abrupt wavy boundary.

B2h—27 to 35 inches; dark reddish brown (5YR 2/2) fine sand; weak coarse subangular blocky structure; friable; few fine roots; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

Figure 9.—Profile of Pomona fine sand. The dark colored subsoil is at a depth of about 22 inches. Depth is shown in meters and feet.

B3—35 to 46 inches; brown (10YR 4/3) fine sand; weak coarse subangular blocky structure; loose; few fine roots; very strongly acid; clear wavy boundary.

A'2—46 to 57 inches; brown (10YR 5/3) fine sand; many coarse distinct black (10YR 2/1) bodies; single grained; loose; few fine roots; 1 percent fine and coarse rock fragments (iron-magnesium nodules); very strongly acid; abrupt wavy boundary.

B'tg—57 to 80 inches; gray (5Y 6/1) fine sandy loam; common coarse distinct olive yellow (5Y 6/6) mottles and common medium distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; very strongly acid.

Pomona soils range from extremely acid to strongly acid in all horizons.

The A1 horizon has hue of 10YR, value of 2 to 4, and chroma of 1. If undisturbed, it is a mixture of uncoated sand grains and organic matter. Its texture is fine sand or sand.

The A2 horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. Its texture is fine sand or sand. The A horizon ranges from 15 to 30 inches in thickness.

The Bh horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3, and chroma of 4 or less. Its texture is fine sand or sand, and in some pedons the sand grains are weakly cemented by organic matter. The horizon ranges from 8 to 20 inches in thickness.

The B3 horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 3 or 4. Its texture is fine sand or sand. The horizon ranges from 10 to 22 inches in thickness.

The A'2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 3. Its texture is fine sand or sand. The horizon ranges from 8 to 24 inches in thickness.

The B'tg horizon has hue of 10YR or 5Y, value of 5 or 6, and chroma of 1 or 2. Its texture is sandy loam, fine sandy loam, or sandy clay loam. In some pedons the horizon has brown, yellow, and gray mottles. It ranges from 7 to 20 inches in thickness.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Its texture is sand, fine sand, sandy loam, fine sandy loam, loamy fine sand, loamy sand, or a combination of two or more textures. There is no C horizon in some pedons.

Pompano Series

The Pompano series consists of nearly level, poorly drained soils on flood plains along small streams and in poorly defined drainageways throughout the county. The soils formed in thick deposits of marine sand. In most years the water table is at a depth of less than 10 inches for cumulative periods of 2 to 6 months. Generally, the soils are flooded every year and more than once in most years. Slopes are less than 2 percent. These soils are siliceous, hyperthermic Typic Psammaquents.

Pompano soils are near Adamsville, Basinger, and Placid soils. Adamsville soils are somewhat poorly drained and are on slightly higher ridges on the landscape. Basinger soils have an A2&Bh horizon. Placid soils are in depressions and have an umbric epipedon.

Typical pedon of Pompano fine sand, frequently flooded, in a wooded area, 2.5 miles southwest of Bowling Green, 0.5 mile west of State Highway 636 in NW1/4SE1/4NW1/4 sec. 14, T. 33 S., R. 25 E.

A1—0 to 4 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; very friable; many fine roots; mixture of organic matter and light gray sand grains when dry has a salt-and-pepper appearance; medium acid; gradual smooth boundary.

C1—4 to 45 inches; light gray (10YR 7/1) fine sand; single grained; loose; many fine roots; many uncoated sand grains; slightly acid; gradual wavy boundary.

C2—45 to 80 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; slightly acid.

Pompano soils range from very strongly acid to neutral throughout. They are fine sand throughout.

The A1 horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. It is 5 to 8 inches thick. The A12 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It ranges from 3 to 13 inches in thickness. There is no A12 horizon in some pedons.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. In most pedons it has light gray and dark brown mottles.

Popash Series

The Popash series consists of very poorly drained, nearly level soils that formed in sandy and loamy marine material. The soils are in depressions. If the soils are not drained, water stands on the surface for more than 6 months of the year. Slopes are less than 2 percent. These soils are loamy, siliceous, hyperthermic Typic Umbraqualfs.

Popash soils are near Basinger, Felda, Floridana, and Pompano soils. Basinger soils have an A2&Bh horizon and do not have a mollic epipedon. Felda soils are poorly drained and have an argillic horizon between depths of 20 and 40 inches. Floridana soils are in about the same position on the landscape as Popash soils but do not have an argillic horizon between depths of 20 and 40 inches. Pompano soils are poorly drained and do not have a mollic epipedon or a B2tg horizon.

Typical pedon of Popash mucky fine sand, in a pasture, 2 miles west of Wauchula in SE1/4SE1/4SW1/4 sec. 6, T. 34 S., R. 25 E.

A11—0 to 10 inches; black (10YR 2/1) mucky fine sand; weak medium granular structure; friable; many fine roots; few medium faint dark gray sand pockets; about 10 percent organic matter; medium acid; gradual smooth boundary.

A12—10 to 21 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; friable; many fine roots; common medium and few coarse faint dark gray and gray sand pockets; about 5 percent organic matter; medium acid; clear wavy boundary.

A21g—21 to 32 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine and medium faint very dark gray and dark gray stains along old root channels; many fine roots; slightly acid; gradual wavy boundary.

A22g—32 to 52 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; few fine and medium faint very dark gray and dark gray stains along old

roots channels; many fine roots; slightly acid; gradual wavy boundary.

Btg—52 to 80 inches; light brownish gray (2.5Y 6/2) sandy loam; few fine faint dark grayish brown and fine distinct light olive brown mottles; weak coarse subangular blocky structure; slightly plastic; sand grains are mostly bridged and coated with clay but some are uncoated; neutral.

Popash soils range from extremely acid to slightly acid in the surface layer and from medium acid to neutral in the other layers.

The A1 horizon has hue of 5Y or 10YR, value of 2 or 3, and chroma of 1 or less. It is 10 to 24 inches thick. The A12 horizon is fine sand or sand.

The A2g horizon has hue of 10YR, value of 4 through 6, and chroma of 2 or less. In some pedons has few to common brown or yellow mottles. In some pedons there are thin, very dark gray or black tongues of material from the A1 horizon extending into this horizon. The horizon ranges from 27 to 55 inches in thickness.

The Btg horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 or less. In some pedons it has brown, yellow, or gray mottles. Its texture is sandy loam, fine sandy loam, or sandy clay loam. The horizon extends to a depth of more than 80 inches.

Samsula Series

The Samusula series consists of nearly level, very poorly drained soils that formed in well decomposed organic matter and in the underlying sandy marine sediment. The soils are in low depressions. In most years, if the soils are not drained, the water table is at or near the surface for 6 to 12 months and usually is above the surface for very long periods. Slopes are less than 2 percent. These soils are sandy or sandy-skeletal, siliceous, dysic, hyperthermic Terric Medisaprists.

Samsula soils are near Basinger, Felda, Floridana, Placid, and Pompano soils, all of which are mineral soils in higher positions on the landscape.

Typical pedon of Samsula muck, in a ponded area, approximately 0.8 mile west of the intersection of State Highway 663 and Experiment Station Road and 8,900 feet south of State Highway 663, NE1/4SW1/4 sec. 31, T. 35 S., R. 24 E.

Oa1—0 to 10 inches; black (5YR 2/1) muck; about 15 percent fiber, less than 5 percent rubbed; weak medium granular structure; very friable; few fine roots; sodium pyrophosphate extract is dark yellowish brown (10YR 4/4); extremely acid; gradual wavy boundary.

Oa2—10 to 25 inches; black (5YR 2/1) muck; about 10 percent fiber, less than 5 percent rubbed; weak medium granular structure; very friable; few fine partly decomposed roots; sodium pyrophospate extract is dark yellowish brown (10YR 4/4); extremely acid; gradual wavy boundary.

IIAb—25 to 33 inches; black (10YR 2/1) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

IICb—33 to 65 inches; light gray (10YR 7/2) fine sand; single grained; loose; very strongly acid.

The Oa horizon has no hue (N) or has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3, and chroma of 3 or less. The content of unrubbed fiber is 10 to 33 percent, and the content of rubbed fiber is less than 5 percent. Reaction is extremely acid to very strongly acid by the Hellige-Truog field test or is less than pH 4.5 in 0.01*M* calcium chloride. The organic material ranges from 16 to 40 inches in thickness.

The IIAb horizon has hue of 10YR, value of 2 or 3, and chroma of 1.

The IICb horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2.

The IIAb and IICb horizons are sand or fine sand. Reaction is strongly acid or very strongly acid.

Smyrna Series

The Smyrna series consists of nearly level, poorly drained, deep sandy soils in broad areas of flatwoods. Slopes are less than 2 percent. In most years, if the soils are not drained, the water table is at a depth of less than 10 inches for 1 to 4 months and is between depths of 10 and 40 inches for more than 6 months. These soils are sandy, siliceous, hyperthermic Aeric Haplaquods.

Smyrna soils are near Basinger, Immokalee, and Myakka soils. Basinger soils have an A&Bh horizon between depths of 20 and 40 inches. Immokalee soils have a Bh horizon at a depth of more than 30 inches. Myakka soils have a Bh horizon between depths of 20 and 30 inches.

Typical pedon of Smyrna sand, in a pasture, approximately 6.5 miles west of Fort Green Springs and 1 mile north of State Highway 62, NW1/4NW1/4 sec. 17, T. 33 S., R. 23 E.

A1—0 to 5 inches; very dark gray (10YR 3/1) sand, rubbed; weak coarse crumb structure; very friable; many fine and medium roots; extremely acid; gradual wavy boundary.

A2—5 to 16 inches; light gray (10YR 7/1) sand; single grained; loose; many fine and medium roots; very strongly acid; abrupt wavy boundary.

B21h—16 to 20 inches; black (5YR 2/1) sand; weak coarse subangular blocky structure; few medium decaying roots; sand grains coated with organic matter; extremely acid; clear wavy boundary.

B22h—20 to 24 inches; dark reddish brown (5YR 3/4) sand; weak coarse subangular blocky structure; few

medium decaying roots; many uncoated sand grains; very strongly acid; clear wavy boundary.

B3&Bh—24 to 29 inches; dark brown (7.5YR 4/4) sand; common coarse distinct weakly cemented dark reddish brown (5YR 3/2) natural Bh fragments; massive in place, parting to moderate medium granular structure; few medium decaying roots; many uncoated sand grains; very strongly acid; clear wavy boundary.

A'2—29 to 48 inches; light gray (10YR 7/2) sand; few fine distinct brownish yellow (10YR 6/6) mottles; single grained; loose; very strongly acid; abrupt wavy boundary.

B'21h—48 to 68 inches; dark brown (7.5YR 4/2) sand; dark reddish brown (5YR 3/2) bodies; weak coarse subangular blocky structure; friable; very strongly acid; clear wavy boundary.

B'22h—68 to 80 inches; dark brown (7.5YR 4/2) sand; weak coarse subangular blocky structure; friable; very strongly acid.

Smyrna soils are extremely acid to strongly acid throughout. They are sand or fine sand throughout.

The Ap or A1 horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 0. It is 4 to 6 inches thick. The A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is 7 to 11 inches thick.

The Bh horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 1 to 4. It is 8 to 15 inches thick.

The B3&Bh horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is 4 to 12 inches thick.

The A'2 horizon has hue of 10YR, value of 5 to 7, and chroma of 2 or 3. It is 5 to 11 inches thick.

The B'h horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 to 4, and chroma of 2 or 3. It ranges from 10 to 20 inches in thickness.

Sparr Series

The Sparr series consists of nearly level, somewhat poorly drained soils that formed in sandy and loamy marine sediment. The water table is at a depth of 20 to 40 inches for periods of 1 to 4 months. It is usually perched on the Bt horizon. Slopes are smooth to concave and range from 0 to 2 percent. These soils are loamy, siliceous, hyperthermic Grossarenic Paleudults.

Sparr soils are near Apopka, Candler, and Tavares soils. Between depths of 40 and 80 inches, Apopka soils have redder loamy material than Sparr soils. Candler soils are excessively drained and do not have an argillic horizon. Tavares soils are moderately well drained and do not have an argillic horizon.

Typical pedon of Sparr fine sand, 3 miles west of Bowling Green and 100 feet north of County Highway 664, NW1/4NE1/4 sec. 12, T. 33 S., R. 24 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) fine sand; weak fine crumb structure; very friable; common fine and medium roots; neutral; abrupt smooth boundary.

A21—6 to 16 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; common fine and medium roots; slightly acid; clear wavy boundary.

A22—16 to 29 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common fine and medium roots; strongly acid; clear wavy boundary.

A23—29 to 43 inches; very pale brown (10YR 7/4) fine sand; common medium distinct strong brown (7.5YR 5/8) and white (10YR 8/1) mottles; single grained; loose; common fine and medium roots; very strongly acid; clear wavy boundary.

A24—43 to 53 inches; very pale brown (10YR 7/3) fine sand; many medium distinct white (10YR 8/1) and strong brown (7.5YR 5/8) mottles; single grained; loose; few medium roots; very strongly acid; clear wavy boundary.

A3—53 to 60 inches; light yellowish brown (10YR 6/4) fine sand; common medium distinct yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; single grained; loose; very friable; about 3 percent plinthite; very strongly acid; clear wavy boundary.

B21tg—60 to 67 inches; light gray (N 7/0) fine sandy loam; many medium distinct light olive brown (2.5Y 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; clay bridging between sand grains; about 3 percent plinthite; very strongly acid; clear wavy boundary.

B22tg—67 to 80 inches; light gray (N 7/0) sandy clay loam; many medium distinct brownish yellow (10YR 6/6) mottles; moderate coarse subangular blocky structure; clay bridging between sand grains; about 4 percent plinthite; very strongly acid.

Unless limed, Sparr soils are strongly acid or very strongly acid in the A horizon and are strongly acid to extremely acid in the B horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 4. It is 5 to 8 inches thick.

The A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 through 4.

The A3 horizon has hue of 10YR, value of 5, and chroma of 4 to 8 or value of 6, and chroma of 4 and has mottles in shades of brown, yellow, gray, and red. There is no A3 horizon in some pedons. The A horizon ranges from 42 to 68 inches in thickness.

The Btg horizon has no hue (N) or has hue of 10YR, value of 5 to 7, and chroma of 2 or less. It has yellow, brown, and red mottles. It is sandy loam or sandy clay loam. It ranges from 4 to 24 inches in thickness.

St. Lucie Series

The St. Lucie series consists of nearly level, excessively drained acid soils that formed in thick beds of sandy marine or eolian deposits. The soils are on ridgetops, knolls, and dunes throughout the county. The water table is at a depth of 72 to 120 inches. Slopes are 0 to 2 percent. These soils are hyperthermic, uncoated Typic Quartzipsamments.

St. Lucie soils are near Candler, Pomello, and Tavares soils. Candler soils are in about the same position on the landscape but have lamellae. Tavares soils are moderately well drained and are at lower elevations on the landscape. In addition, they have mottles (evidence of wetness) at a depth of 40 inches or more. Pomello soils are moderately well drained, are at lower elevations on the landscape, and have a spodic horizon between depths of 30 and 50 inches.

Typical pedon of St. Lucie fine sand, in a citrus grove, approximately 2.5 miles south of Wauchula on County Highway 35A, 0.25 mile west on Alec Hendry Road, and 100 feet north of road, SE1/4SW1/4 sec. 16, T. 34 S., R. 25 E.

Ap—0 to 4 inches; dark gray (10YR 4/1) fine sand, rubbed; single grained; loose; few large roots; many large and medium pores; strongly acid; clear smooth boundary.

C1—4 to 17 inches; white (10YR 8/1) fine sand; single grained; loose; few large roots; common medium distinct black (10YR 2/1) pieces of charcoal; many large and medium pores; sand grains are uncoated; strongly acid; gradual wavy boundary.

C2—17 to 80 inches; white (10YR 8/1) fine sand; single grained; loose; few large roots; many large and medium pores; sand grains are uncoated; strongly acid.

St. Lucie soils are fine sand or sand throughout. They are extremely acid to medium acid within a depth of 80 inches.

The A horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. It is 2 to 4 inches thick.

The C horizon has no hue (N) or has hue of 10YR, value of 6 to 8, and chroma of 2 or less.

Tavares Series

The Tavares series consists of nearly level to gently sloping, moderately well drained soils that formed in thick beds of sandy marine or eolian sediment. The soils are on knolls and ridges throughout the county. In most years, if the soils are not drained, the water table is at a depth of 40 to 80 inches for 6 to 10 months and below a depth of 80 inches during very dry periods. These soils are hyperthermic, uncoated Typic Quartzipsamments.

Tavares soils are near Adamsville, Candler, Myakka, and St. Lucie soils. Adamsville soils are on low broad flats and are somewhat poorly drained. Candler soils are well drained and have lamellae between depths of 40 and 80 inches. Myakka soils are poorly drained; they have a leached A2 horizon and a Bh horizon. St. Lucie soils are excessively drained; they are white sand throughout.

Typical pedon of Tavares fine sand, 0 to 5 percent slopes (fig. 10), approximately 0.5 mile east of U.S. Highway 17 and 0.5 mile north of Wauchula Hills, SW1/4NE1/4 sec. 28, T. 33 S., R. 25 E.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) fine sand; weak fine granular structure; friable; common uncoated light gray sand grains; few fine

Figure 10.—Profile of Tavares fine sand, 0 to 5 percent slopes. Depth is shown in meters and feet.

and medium roots; slightly acid; abrupt smooth boundary.

C1—5 to 24 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; few fine roots; common very fine carbon particles; many uncoated sand grains; medium acid; clear wavy boundary.

C2—24 to 50 inches; very pale brown (10YR 7/4) fine sand; common medium distinct reddish yellow (7.5YR 6/8) mottles; single grained; loose; few fine roots; many uncoated sand grains; medium acid; gradual wavy boundary.

C3—50 to 69 inches; white (10YR 8/2) fine sand; common medium distinct strong brown (7.5YR 5/8) mottles; single grained; slightly acid; gradual wavy boundary.

C4—69 to 80 inches; very pale brown (10YR 8/4) fine sand; few medium distinct brownish yellow (10YR 6/6) mottles; single grained; loose; strongly acid.

Tavares soils are very strongly acid to slightly acid throughout. They are less than 5 percent silt plus clay within the 10- to 40-inch control section.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or less. It is 4 to 8 inches thick.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. In most places the upper part of the C horizon has chroma of 3 to 6, and the lower part has chroma of 1 to 4. The lower part of the C horizon generally has brown, gray, yellow, or red mottles.

Wabasso Series

The Wabasso series consists of nearly level, poorly drained sandy soils that formed in sandy and loamy marine sediment. The soils are in low, broad areas of flatwoods. In most years, if the soils are not drained, the water table is at a depth of 10 to 40 inches for more than 6 months; it is at a depth of less than 10 inches for less than 60 days in wet seasons and is at a depth of more than 40 inches in very dry seasons. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Alfic Haplaquods.

Wabasso soils are near Basinger, Felda, Pomona, Popash, and Floridana soils. Basinger soils are in poorly defined drainageways and in sloughs and do not have a spodic horizon or an argillic horizon. Floridana and Popash soils have a dark colored surface, do not have a spodic horizon, and are in depressions. Felda soils do not have a spodic horizon. Pomona soils have an argillic horizon between depths of 40 and 80 inches. Pomona and Felda soils are in the same position on the landscape as Wabasso soils.

Typical pedon of Wabasso fine sand, in an improved pasture, 0.8 mile north of junction of County Highway 35A and U.S. Highway 17, 1.2 miles northeast on Maxwell road, 0.5 mile northeast of Maxwell road, NE1/4NW1/4 sec. 22, T. 33 S., R. 25 E.

Ap—0 to 4 inches; black (10YR 2/1) fine sand; mixture of organic matter and light gray sand grains has a salt-and-pepper appearance; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

A21—4 to 18 inches; gray (10YR 5/1) fine sand; single grained; loose; common fine and medium roots; common uncoated sand grains; strongly acid; clear smooth boundary.

A22—18 to 24 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; medium vertical dark gray and very dark gray streaks in the matrix and along root channels; few medium roots; very strongly acid; abrupt wavy boundary.

Bh—24 to 32 inches; very dark grayish brown (10YR 3/2) fine sand; massive parting to moderate fine granular structure; firm; sand grains are coated with organic matter; few fine roots; very strongly acid; clear wavy boundary.

B'21t—32 to 52 inches; light brownish gray (2.5Y 6/2) sandy loam; few fine distinct strong brown (7.5YR 5/8) and few fine faint gray (N 5/0) mottles; weak fine subangular blocky structure; friable; sand grains are bridged and coated with clay; slightly acid; gradual wavy boundary.

B'22tg—52 to 64 inches; gray (5Y 6/1) sandy loam; few coarse distinct reddish yellow (7.5YR 6/6) mottles; weak fine subangular blocky structure; firm; sand grains distinctly coated and bridged with clay; few thin patchy clay films on faces of peds and in root channels; slightly acid; gradual wavy boundary.

B'23tg—64 to 70 inches; light olive gray (5Y 6/2) sandy loam; few fine distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; sand grains coated and weakly bridged with clay; few lenses of fine sand; slightly acid; gradual wavy boundary.

Cg—70 to 80 inches; olive gray (5Y 5/2) loamy sand; few fine distinct brownish yellow and strong brown mottles; massive; friable; neutral.

Wabasso soils are neutral to very strongly acid in the A and Bh horizons and are medium acid to mildly alkaline below the Bh horizon.

The Ap or A1 horizon has a salt-and-pepper appearance if undisturbed. It is 3 to 6 inches thick. The A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The A horizon ranges from 16 to 30 inches in thickness.

The Bh horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3, and chroma of 3 or less. It ranges from 7 to 18 inches in thickness.

The B3 horizon has hue of 10YR, 7.5YR, or 5YR, value of 4, and chroma of 2 to 4. Its texture is fine sand or sand. The horizon ranges from 0 to 6 inches in thickness. There is no B3 horizon in some pedons. The

B3&Bh horizon has matrix colors that are similar to the colors of the B3 horizon. It has black or dark reddish brown weakly cemented Bh fragments. There is no B3&Bh horizon in some pedons.

The A'2 horizon has no hue (N) or has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 3 or less. Its texture is fine sand or sand. The horizon ranges from 0 to 14 inches in thickness. There is no A'2 horizon in some pedons.

The B'2t horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 to 8. It has gray, brown, yellow, and red mottles. Its texture is fine sandy loam, sandy loam, or sandy clay loam. In some pedons the horizon has few to common, fine and medium nodules of white (10YR 8/1) carbonatic material. The horizon is at a depth within 26 to 40 inches of the surface. It ranges from 15 to 40 inches in thickness.

The Cg horizon has no hue (N) or has hue of 10YR or 5Y, value of 5 to 7, and chroma of 2 or less. In some pedons it consists of fragments of shells or of a mixture of sand or loamy sand and fragments of shells.

Wauchula Series

The Wauchula series consists of nearly level, poorly drained sandy soils that formed in sandy and loamy marine sediment. The soils are in broad, low areas in the flatwoods. In most years, if the soils are not drained, the water table is at a depth of 10 to 40 inches for more than 6 months; it is at a depth of less than 10 inches for 2 months in wet seasons and is at a depth of more than 40 inches in very dry seasons. These soils are sandy, siliceous, hyperthermic Ultic Haplaquods.

Wauchula soils are near Myakka, Pomona, and Wabasso soils. Myakka soils do not have an argillic horizon. Pomona soils have an argillic horizon at a depth of more than 40 inches. Wabasso soils have a high base saturation in the argillic horizon.

Typical pedon of Wauchula fine sand, in a pasture, approximately 1,700 feet north of State Highway 64 and 1,500 feet west of Peace River, NW1/4NE1/4 sec. 3, T. 4 S., R. 25 E.

Ap—0 to 6 inches; very dark gray (10YR 3/1) fine sand; weak fine crumb structure; very friable; common fine and medium roots; very strongly acid; abrupt smooth boundary.

A21—6 to 14 inches; gray (10YR 6/1) fine sand; single grained; loose; common fine and medium roots; very strongly acid; clear wavy boundary.

A22—14 to 22 inches; light gray (10YR 7/1) fine sand; single grained; loose; common fine and medium roots; strongly acid; abrupt wavy boundary.

B21h—22 to 29 inches; dark reddish brown (5YR 3/3) fine sand; moderate medium granular structure; friable; many sand grains coated with organic matter, few uncoated sand grains; common fine and medium roots; very strongly acid; gradual wavy boundary.

B22h—29 to 34 inches; dark reddish brown (5YR 3/2) fine sand; weak coarse subangular blocky structure; firm; few medium roots; many sand grains coated with organic matter; strongly acid; gradual wavy boundary.

B3—34 to 38 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; very strongly acid; abrupt wavy boundary.

B'2tg—38 to 50 inches; grayish brown (10YR 5/2) sandy clay loam; common fine distinct yellowish brown (10YR 5/8) mottles; moderate coarse subangular blocky structure; firm; sand grains distinctly coated and bridged with clay; few thin patchy clay films on faces of peds and in root channels; very strongly acid; gradual wavy boundary.

B'3g—50 to 80 inches; greenish gray (5GY 5/1) loamy fine sand; weak coarse subangular blocky structure; friable; strongly acid.

The Wauchula soils are strongly acid to extremely acid throughout. The Ap or A1 horizon has no hue (N) or has hue of 10YR, value of 2 to 4, and chroma of 2 or less. It has a salt-and-pepper appearance if undisturbed. It is 3 to 8 inches thick.

The A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 2 or less. In some pedons it has yellow, brown, or red mottles. Its texture is fine sand or sand. The A2 horizon ranges from 8 to 20 inches in thickness.

The Bh horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3, and chroma of 3 or less. Its texture is fine sand or sand. The horizon is 7 to 16 inches thick.

The B3 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4 or value of 3 and chroma of 3 or 4. Its texture is fine sand or sand. The horizon ranges from 0 to 6 inches in thickness.

The A'2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 through 4. Its texture is fine sand or sand. The horizon is 3 to 6 inches thick. There is no A'2 horizon in some pedons.

The B'2tg horizon has no hue (N) or has hue of 10YR, 2.5Y, 5Y, or 5GY, value of 4 to 7, and chroma of 2 or less. It has brown, yellow, and red mottles. In some pedons it has lenses of sandy material. The content of clay ranges from about 15 to 35 percent. The horizon is fine sandy loam or sandy clay loam. It is at a depth of about 25 to 40 inches.

The B'3g horizon has no hue (N) or has hue of 5GY, 5Y, 2.5Y, or 10YR, value of 4 to 7, and chroma of 2 or less. Its texture is loamy fine sand, fine sandy loam, or mixed sandy loam and pockets of fine sand.

The C horizon is fine sandy loam or mixed sandy loam and loamy sand to a depth of more than 60 inches. It has the same colors that the B'3g horizon has. There is no C horizon in some pedons.

Zolfo Series

The Zolfo series consists of nearly level, somewhat poorly drained soils that formed in thick sandy marine sediment. These soils are on broad, nearly level ridges on uplands. In most years, if the soils are not drained, the water table is at a depth of 20 to 40 inches for 2 to 6 months; it rises to within 20 inches of the surface for less than 2 weeks in very wet seasons and recedes to a depth of more than 40 inches during dry periods. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Grossarenic Entic Haplohumods.

Zolfo soils are near Immokalee, Pomello, and Tavares soils. Zolfo soils are in slightly lower positions on the landscape than the Tavares soils, and they have a spodic horizon. They are in slightly higher positions on the landscape than the Immokalee and Pomello soils, and they have a Bh horizon at a depth between 50 and 80 inches. Unlike Zolfo soils, the Immokalee soils are poorly drained.

Typical pedon of Zolfo fine sand, in a citrus grove, 1,100 feet west of the junction of County Highway 35A and Metheny Road, 0.75 mile north of Wauchula, NW1/4NE1/4SW1/4 sec. 33, T. 33 S., R. 25 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; many fine and medium roots; neutral; clear smooth boundary.

A21—7 to 16 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; many fine and medium roots; neutral; clear smooth boundary.

A22—16 to 28 inches; grayish brown (10YR 5/2) fine sand; common fine distinct yellowish brown (10YR 5/4) mottles that increase in number in the lower part of the horizon; single grained; loose; common fine and medium roots; neutral; gradual wavy boundary.

A23—28 to 45 inches; very pale brown (10YR 7/3) fine sand; few fine distinct yellow (10YR 7/8) mottles; single grained; loose; few fine and medium roots; neutral; gradual wavy boundary.

A24—45 to 63 inches; light brownish gray (10YR 6/2) fine sand; few fine distinct brownish yellow (10YR 6/8) mottles; single grained; loose; neutral; gradual wavy boundary.

B21h—63 to 68 inches; dark brown (7.5YR 3/2) fine sand; weak fine granular structure; very friable; most sand grains coated with organic matter; slightly acid; gradual smooth boundary.

B22h—68 to 80 inches; black (5YR 2/1) fine sand; weak fine subangular blocky structure; very friable; sand grains coated with organic matter; slightly acid.

The solum is 80 inches thick or more. Reaction ranges from strongly acid to neutral throughout.

The Ap or A1 horizon has hue of 10YR, value of 2 to 5, and chroma of 2 or less. It is 4 to 9 inches thick. The A2 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It has few to common yellow, brown, or gray mottles. The A horizon ranges from 50 to 70 inches in thickness.

The B21h horizon has hue of 10YR, 7.5YR, or 5YR, value of 3, and chroma of 2 or 3; or it has value of 4 and chroma of 2. There are few to common uncoated sand grains in this horizon. The horizon is 2 to 8 inches thick.

The B22h horizon has hue of 10YR, 7.5YR, or 5YR; value of 2 or 3; and chroma of 3 or less. Where the horizon is black, it generally is less than 8 inches thick.

Formation of the Soils

In this section, the processes of soil formation are discussed and related to the soils in the survey area.

Factors of Soil Formation

Soil is produced by forces of weathering and soil formation acting on parent material. The kind of soil that forms depends on five major factors. These factors are: the climate under which soil material has existed since accumulation; the plant and animal life in and on the soil; the type of parent material; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

The five soil-forming factors are interdependent; each modifies the effect of the others. Any one of the five factors can have more influence than the others on the formation of a soil and can account for most of the properties of a soil. For example, if the parent material is quartz sand, the soil generally has only weakly expressed horizons. In some places the effect of the parent material is modified greatly by the effect of climate, relief, and plants and animals in and on the soil. As a soil forms, it is influenced by more than one of the five factors, but in some places just one factor can have the strongest effect. A modification or variation in any of these factors results in a different soil.

Parent Material

The parent material of the soils in Hardee County consists of beds of sandy and clayey material that was transported by waters of the sea that covered the area a number of times during the Pleistocene Epoch. During the high stands of the sea, the Miocene-Pliocene sediment was eroded and redeposited or was reworked on the shallow sea bottom to form marine terraces.

Nearly all of the county is underlain by the Bone Valley Formation (*15*). Part of the county is underlain by the Hawthorn Formation, which is confined to the area of the Peace River and its tributaries and to the southeast corner of the county. The Hawthorn Formation crops out along the Peace River, 1 mile east of Bowling Green, and on the west bank of the Peace River above the bridge on U.S. Highway 17, between Wauchula and Zolfo Springs.

The parent material differs widely in mineral and chemical composition and in physical constitution. The main physical differences, such as those between sand, silt, and clay, are apparent. But less apparent differences, such as mineral and chemical composition, also have an important influence on soil formation and on present physical and chemical characteristics. Many differences among soils appear to reflect original differences in the parent material as it was laid down.

Climate

Precipitation, temperature, humidity, and wind are the climatic forces that act on the parent material of soils. These forces also cause some variation in the plant and animal life on and in the soils. They influence changes in parent material and, consequently, soil development.

Hardee County has a warm, humid climate. The Gulf of Mexico and numerous inland lakes have a moderating effect on temperature in summer and winter. In summer the day-to-day temperature is fairly uniform from year to year. In winter, however, the day-to-day temperature varies considerably. Rainfall averages about 55 inches a year.

Because of the warm climate and the abundant rainfall, chemical and biological processes are rapid. The abundant rainfall leaches much of the plant nutrients from the soils.

Plants and Animals

Plants have been the principal biological factor in the formation of soils in the survey area. Animals, insects, bacteria, and fungi, however, also have been important. Their chief functions have been to add organic matter to the soil and to bring plant nutrients from the lower to the upper horizons. Plants and animals have caused differences in the content of organic matter, nitrogen, and plant nutrients in the soils as well as in soil structure and porosity.

Relief

Relief has affected the formation of the soils in Hardee County primarily through its influence on soil-water relationships and through its effect on erosion in the central ridge part of the county. Other factors of soil formation normally associated with relief, such as temperature and plant cover, are of minor importance.

In the three general areas in the county—flatwoods, swamps, and the central ridge—some differences in the soils are directly related to relief.

The soils in the flatwoods have a high water table, and periodically the surface is wet. The soils in the swamps are covered by water for long periods of time, and in many places the content of organic matter in the surface layer is high. The soils on the central ridge are at higher elevations than those in the flatwoods and swamps. Most of the deep, sandy soils on the central ridge are better drained than the soils in the flatwoods and swamps and are not influenced by a ground water table. Some of the clayey and loamy soils in the central part of the ridge are influenced by a ground water table and also are subject to much more erosion than soils in other parts of the county.

Time

Time is an important factor in soil formation. The physical and chemical changes brought about by climate, living organisms, and relief are slow. The length of time needed for soil to form in geologic material varies with the nature of the geologic material and with the interaction of the other factors. Some minerals in which the soils formed weather fairly rapidly, but other minerals are chemically inert and change little over long periods of time. The time required for the translocation of fine particles within the soil to form the various horizons varies under different conditions but is always relatively long.

The dominant geologic material, sand, is inactive. The sand is almost pure quartz and is highly resistant to weathering. The finer textured silt and clay are products of earlier weathering.

In terms of geologic time, relatively little time has elapsed since the parent material of the soils was laid down or emerged from the sea. The loamy and clayey horizons formed in place through the process of clay translocation.

Processes of Soil Formation

Soil morphology refers to the process of formation of soil horizons. The differentiation of soil horizons is the result of accumulation of organic matter, leaching of carbonates, reduction and transfer of iron, or accumulation of silicate clay minerals or more than one of these processes.

Some organic matter has accumulated in the upper layers of most of the soils to form an A1 horizon. The content of organic matter is low in some of the soils but relatively high in others.

Leaching to varying degrees has occurred in most soils. In nearly all soils carbonates and salts have been leached. In some soils the effects of leaching have been indirect in that the leaching permitted the subsequent translocation of silicate clay material.

The reduction and transfer of iron has occurred in all soils except the organic soils. In some of the wet soils, iron has been segregated within the deeper horizons to form reddish brown mottles and concretions. For example, in the Sparr soils there is evidence of wetness and movement or alteration of clay in the form of a light-colored, leached A2 horizon and a loamy Bt horizon that has sand grains coated and bridged with clay material.

References

(1) American Association of State Highway [and Transportation] Officials. 1970. Standard sepcifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Bouyoucos, G. J. 1962. Hydrometer method improved for making particle size analyses of soils. Agron. J. 54: 464-465.

(4) Cooke, C. Wythe. 1945. Geology of Florida. Fla. State Dep. Conserv. & Fla. Geol. Surv. Geol. Bull. 29, 339 pp., illus.

(5) Frisbie, Louise K. 1976. Peace River Pioneers. E.E. Seeman Pub. Inc., 134 pp., illus.

(6) Plowden, Gene. 1929. History of Hardee County. The Florida Advocate, Wauchula, Fla., 85 pp.

(7) United States Department of Agriculture. 1938. Soils and men. U.S. Dep. Agric. Yearb., 1232 pp., illus.

(8) United States Department of Agriculture. 1941. Climate and man. U.S. Dep. Agric. Yearb., 1248 pp., illus.

(9) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May 1962.]

(10) United States Department of Agriculture. 1960. Management and inventory of southern hardwoods. Forest Serv., U.S. Dep. Agric. Handb. 181, 102 pp.

(11) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(12) United States Department of Agriculture. 1972. Soil survey laboratory methods and procedures for collecting soil samples. Soil Surv. Invest. Rep. 1, 63 pp., illus.

(13) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(14) United States Department of Commerce, National Oceanic and Atmospheric Administration. 1959. Climatography of the United States. Climates of the States. Climate of Florida. No. 60-8, 31 pp., illus. [Rev. Nov. 1962, June 1972]

(15) White, William A. 1970. The Geomorphology of the Florida Peninsula. State Fla., Dep. Nat. Resour. Geol. Bull. No. 51, 165 pp., illus.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The available water capacity is very low if less than 0.05 inch per inch, low if 0.05 to 0.10 inch per inch, moderate if 0.10 to 0.15 inch per inch, high if 0.15 to 0.20 inch per inch, and very high if more than 0.20 inch per inch. The capacity, in inches, in a 60-inch profile or to a limiting layer may also be expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the

surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A1 horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

A2 horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, alluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-

forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5

millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor, on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction

because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the

underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1932-78 at Wauchula, Florida]

Month	Temperature					Precipitation				
	Monthly normal mean	Normal daily maximum	Normal daily minimum	Mean number of days with temperature of-- 90° F or higher	Mean number of days with temperature of-- 32° F or lower	Normal total	Maximum total	Minimum total	Mean number of days with rainfall of-- 0.10 inch or more	Mean number of days with rainfall of-- 0.50 inch or more
	°F	°F	°F			In	In	In		
January	61.2	73.2	49.1	0	2	2.00	8.74	0.12	6	1
February	62.5	74.9	50.0	0	1	2.45	6.59	0.17	7	2
March	66.9	79.5	54.3	0	0	2.74	12.94	0.78	8	3
April	71.1	84.0	58.2	2	0	2.37	8.48	0.00	6	3
May	75.6	88.1	63.1	12	0	3.94	9.68	0.13	9	3
June	79.4	90.2	68.6	20	0	8.54	14.86	1.87	15	5
July	80.8	90.6	70.9	21	0	9.30	15.67	3.09	18	3
August	81.1	90.6	71.5	22	0	8.09	15.57	3.40	18	4
September	80.0	89.2	70.8	15	0	7.23	11.68	1.26	14	5
October	74.7	84.9	64.4	3	0	3.25	6.72	0.25	8	4
November	67.4	79.0	55.8	0	0	1.75	5.94	Trace	5	1
December	62.6	74.7	50.4	0	1	1.86	5.33	0.09	6	1
Year	71.9	83.2	60.59	95	4	53.52	122.20	11.16	120	35

TABLE 2.--FREEZE DATA

[Recorded in the period 1921-50 at Wauchula, Florida]

Freeze threshold temperature	Mean date of last freeze	Mean date of first freeze	Mean number of days between dates	Number of freezes[1]	Number of freezes[2]
32	January 26	December 18	326	21	16
28	January 4	December 27	357	5	6
24	(3)	(3)	(3)	3	1
20	(3)	(3)	(3)	0	0

[1]The average number of freezes that occur in the early part of the calendar year; data based on a 30-year record.

[2]The average number of freezes that occur in the later part of the calendar year; data based on a 30-year record.

[3]Temperatures this low occur 1 year in 10 or less.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Adamsville fine sand	3,077	0.8
2	Zolfo fine sand	19,152	5.0
3	Ft. Green fine sand, 2 to 5 percent slopes	1,752	0.4
4	Apopka fine sand, 0 to 5 percent slopes	254	0.1
5	Tavares fine sand, 0 to 5 percent slopes	7,421	2.0
6	Candler fine sand, 0 to 5 percent slopes	1,804	0.4
7	Basinger fine sand	10,178	2.5
8	Bradenton loamy fine sand, frequently flooded	2,952	0.7
9	Popash mucky fine sand	6,146	1.5
10	Pomona fine sand	72,725	18.0
11	Felda fine sand	5,795	1.4
12	Felda fine sand, frequently flooded	7,755	1.9
13	Floridana mucky fine sand, depressional	9,277	2.3
15	Immokalee fine sand	23,519	5.8
16	Myakka fine sand	44,444	11.0
17	Smyrna sand	56,943	14.1
18	Cassia fine sand	4,361	1.1
19	Ona fine sand	14,653	3.6
20	Samsula muck	2,797	0.7
21	Placid fine sand, depressional	8,826	2.2
22	Pomello fine sand	5,782	1.4
23	Sparr fine sand	3,399	0.8
24	Jonathan sand	2,134	0.5
25	Wabasso fine sand	2,115	0.5
26	Electra sand	525	0.1
27	Bradenton-Felda-Chobee association, frequently flooded	45,721	11.3
28	Holopaw fine sand	2,276	0.6
29	Pits	69	*
30	Hontoon muck	349	0.1
31	Pompano fine sand, frequently flooded	1,225	0.3
32	Felda fine sand, depressional	2,809	0.7
33	Manatee mucky fine sand, depressional	2,547	0.6
34	Wauchula fine sand	6,488	1.6
35	Farmton fine sand	5,881	1.5
36	Kaliga muck	8,482	2.1
37	Basinger fine sand, depressional	2,325	0.6
38	St. Lucie fine sand	865	0.2
39	Bradenton loamy fine sand	6,001	1.5
	Water	376	0.1
	Total	403,200	100.0

* Less than 0.1 percent.

TABLE 4.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Oranges	Grapefruit	Cabbage	Cucumbers	Tomatoes	Bahiagrass	Grass-clover	Water-melons
	Box	Box	Crate	Ton	Ton	AUM*	AUM*	Ton
1---------- Adamsville	375	500	400	6.0	8.0	7.0	10.0	---
2---------- Zolfo	375	500	400	---	7.0	7.0	10.0	8.0
3---------- Ft. Green	---	---	---	---	---	4.0	6.0	---
4---------- Apopka	500	700	---	---	---	4.0	---	---
5---------- Tavares	425	600	---	---	---	4.0	---	8.0
6---------- Candler	425	625	---	---	---	5.0	---	10.0
7---------- Basinger	350	450	400	---	---	---	12.0	---
8---------- Bradenton	---	---	---	---	---	9.0	12.0	---
9---------- Popash	---	---	---	---	---	---	---	---
10---------- Pomona	---	---	320	---	---	8.0	10.0	10.0
11---------- Felda	425	625	250	---	---	7.5	10.5	---
12---------- Felda	---	---	---	---	---	7.0	10.0	---
13---------- Floridana	---	---	---	---	---	---	---	---
15---------- Immokalee	350	550	200	6.0	---	8.0	10.0	---
16---------- Myakka	350	550	320	---	8.0	9.0	---	---
17---------- Smyrna	350	550	200	---	8.0	8.0	12.0	10.0
18---------- Cassia	250	350	---	---	---	4.0	---	---
19---------- Ona	350	550	300	6.0	---	8.0	12.0	---
20---------- Samsula	---	---	315	---	---	10.0	---	---
21---------- Placid	---	---	---	---	---	---	---	---
22---------- Pomello	250	400	---	---	---	4.0	---	---
23---------- Sparr	415	615	---	---	8.0	9.0	---	10.0

TABLE 4.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Oranges	Grapefruit	Cabbage	Cucumbers	Tomatoes	Bahiagrass	Grass-clover	Water-melons
	Box	Box	Crate	Ton	Ton	AUM*	AUM*	Ton
24 Jonathan	---	---	---	---	---	3.0	---	---
25 Wabasso	400	575	250	---	8.0	8.0	12.0	---
26 Electra	---	---	---	---	---	6.0	---	---
27:								
Bradenton	---	---	---	---	---	9.0	12.0	---
Felda	---	---	---	---	---	8.0	10.0	---
Chobee	---	---	---	---	---	8.0	12.0	---
28 Holopaw	375	575	240	---	---	8.0	10.0	---
29. Pits								
30 Hontoon	---	---	315	---	---	8.0	---	---
31 Pompano	---	---	---	---	---	---	---	---
32 Felda	---	---	---	---	---	---	---	---
33 Manatee	---	---	---	---	---	---	---	---
34 Wauchula	400	575	250	---	---	8.0	12.0	---
35 Farmton	375	575	200	6.0	---	8.0	10.0	---
36 Kaliga	---	---	280	---	---	12.0	15.0	---
37 Basinger	---	---	---	---	---	---	---	---
38 St. Lucie	---	---	---	---	---	---	---	---
39 Bradenton	450	550	---	---	---	9.0	12.0	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 5.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	---	---	---	---	---
II	---	---	---	---	---
III	78,938	---	71,263	7,675	---
IV	220,567	---	218,763	1,804	---
V	56,428	---	56,428	---	---
VI	14,027	---	1,225	12,802	---
VII	32,795	---	31,930	865	---
VIII	---	---	---	---	---

TABLE 6.--RANGELAND PRODUCTIVITY

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Map symbol and soil name	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
1 Adamsville	South Florida Flatwoods	6,000	4,000	3,000
2 Zolfo	South Florida Flatwoods	6,000	4,000	3,000
3 Ft. Green	South Florida Flatwoods	6,000	4,000	3,000
4 Apopka	Longleaf Pine-Turkey Oak Hills	4,000	3,000	2,000
5 Tavares	Longleaf Pine-Turkey Oak Hills	4,000	3,000	2,000
6 Candler	Longleaf Pine-Turkey Oak Hills	4,000	3,000	2,000
7 Basinger	Slough	8,000	6,000	4,000
8 Bradenton	South Florida Flatwoods	6,000	4,500	3,000
9 Popash	Fresh Water Marsh and Ponds	10,000	8,000	5,000
10 Pomona	South Florida Flatwoods	6,000	4,500	3,000
11, 12 Felda	Slough	8,000	6,000	4,000
13 Floridana	Fresh Water Marsh and Ponds	10,000	8,000	5,000
15 Immokalee	South Florida Flatwoods	6,000	4,500	3,000
16 Myakka	South Florida Flatwoods	6,000	4,500	3,000
17 Smyrna	South Florida Flatwoods	6,000	4,500	3,000
18 Cassia	Sand Pine Scrub	3,500	2,000	1,500
19 Ona	South Florida Flatwoods	6,000	4,500	3,000
20 Samsula	Fresh Water Marsh and Ponds	10,000	8,500	5,000
21 Placid	Fresh Water Marsh and Ponds	10,000	8,000	5,000
22 Pomello	Sand Pine Scrub	3,500	2,000	1,500
23 Sparr	Upland Hardwood Hammocks	4,000	3,000	2,000
24 Jonathan	Sand Pine Scrub	3,500	2,000	1,500
25 Wabasso	South Florida Flatwoods	6,000	4,500	3,000

TABLE 6.--RANGELAND PRODUCTIVITY--Continued

Map symbol and soil name	Range site	Potential annual production for kind of growing season		
		Favorable	Average	Unfavorable
		Lb/acre	Lb/acre	Lb/acre
26: Electra	South Florida Flatwoods	6,000	4,000	3,000
27:				
Bradenton	Cabbage Palm Hammocks	4,000	3,000	2,000
Felda	Cabbage Palm Hammocks	4,000	3,000	2,000
Chobee	Cabbage Palm Hammocks	4,000	3,000	2,000
28: Holopaw	Slough	8,000	6,000	4,000
30: Hontoon	Fresh Water Marsh and Ponds	10,000	8,500	5,000
31: Pompano	Slough	8,000	6,000	4,000
32: Felda	Fresh Water Marsh and Ponds	10,000	8,000	5,000
33: Manatee	Fresh Water Marsh and Ponds	10,000	8,000	5,000
34: Wauchula	South Florida Flatwoods	6,000	4,500	3,000
35: Farmton	South Florida Flatwoods	6,000	4,500	3,000
36: Kaliga	Fresh Water Marsh and Ponds	10,000	8,500	5,000
37: Basinger	Fresh Water Marsh and Ponds	10,000	8,000	5,000
38: St. Lucie	Sand Pine Scrub	3,500	2,000	1,500
39: Bradenton	Cabbage Palm Hammocks	4,000	3,000	2,000

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index[1]	Trees to plant
1---------- Adamsville	3w	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	Slash pine, South Florida slash pine.
						Longleaf pine-------	65	
						South Florida slash pine ----------	45	
2---------- Zolfo	3w	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	Slash pine, South Florida slash pine.
						Longleaf pine-------	65	
						South Florida slash pine ----------	45	
3---------- Ft. Green	3w	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	Slash pine, South Florida slash pine.
						Longleaf pine-------	65	
						South Florida slash pine ----------	45	
4---------- Apopka	3s	Moderate	Moderate	Slight	Slight	Slash pine----------	80	Slash pine, loblolly pine, South Florida slash pine.
						Loblolly pine-------	80	
						Longleaf pine-------	70	
						South Florida slash pine ----------	45	
5---------- Tavares	3s	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	Slash pine, South Florida slash pine.
						Longleaf pine-------	70	
						South Florida slash pine ----------	45	
6---------- Candler	4s	Moderate	Moderate	Slight	Moderate	Slash pine----------	70	Sand pine, slash pine, South Florida slash pine.
						Longleaf pine-------	60	
						Sand pine-----------	75	
						South Florida slash pine ----------	35	
7---------- Basinger	4w	Severe[2]	Severe[2]	Slight	Severe	Slash pine[3]----------	70	South Florida slash pine,[4] slash pine.[4]
						Longleaf pine[3]-------	60	
						South Florida slash pine[3]----------	35	
8---------- Bradenton	2w	Severe	Severe	Slight	Moderate	Slash pine----------	90	Slash pine, South Florida slash pine.
						Longleaf pine-------	75	
						South Florida slash pine ----------	55	
						Sweetgum-----------	---	
						Water oak-----------	---	
10---------- Pomona	3w	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	Slash pine, South Florida slash pine.
						Loblolly pine-------	80	
						Longleaf pine-------	70	
						South Florida slash pine ----------	45	
11, 12---------- Felda	3w	Moderate	Severe	Slight	Moderate	Slash pine----------	80	Slash pine, South Florida slash pine.
						Longleaf pine-------	65	
						South Florida slash pine ----------	45	
15---------- Immokalee	4w	Moderate	Moderate	Moderate	Moderate	Slash pine----------	70	Slash pine, South Florida slash pine.
						Longleaf pine-------	65	
						South Florida slash pine ----------	35	
16---------- Myakka	4w	Moderate	Moderate	Moderate	Moderate	Slash pine----------	70	Slash pine, South Florida slash pine.
						Longleaf pine-------	60	
						South Florida slash pine ----------	35	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index[1]	Trees to plant
17: Smyrna	3w	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine, South Florida slash pine.
						Longleaf pine	70	
						South Florida slash pine	45	
18: Cassia	4s	Moderate	Severe	Slight	Moderate	Slash pine	70	Sand pine, slash pine.
						Longleaf pine	60	
						South Florida slash pine	35	
19: Ona	3w	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine, South Florida slash pine.
						Longleaf pine	70	
						South Florida slash pine	45	
22: Pomello	4s	Moderate	Severe	Moderate	Moderate	Slash pine	70	Sand pine, slash pine, South Florida slash pine.
						Longleaf pine	60	
						Sand pine	60	
						South Florida slash pine	35	
23: Sparr	3s	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine, South Florida slash pine.
						Loblolly pine	80	
						Longleaf pine	70	
						South Florida slash pine	45	
24: Jonathan	5s	Moderate	Severe	Slight	Slight	Sand pine	45	Sand pine.
25: Wabasso	3w	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine, South Florida slash pine.
						South Florida slash pine	45	
26: Electra	4s	Moderate	Severe	Slight	Slight	Slash pine	70	Slash pine, sand pine, South Florida slash pine.
						Sand pine	65	
						Longleaf pine	65	
						South Florida slash pine	35	
27:								
Bradenton	2w	Severe	Severe	Slight	Moderate	Slash pine	90	Slash pine, South Florida slash pine.
						Longleaf pine	75	
						South Florida slash pine	55	
						Sweetgum	---	
						Water oak	---	
Felda	3w	Moderate	Severe	Slight	Moderate	Slash pine	80	Slash pine, South Florida slash pine.
						Longleaf pine	65	
						South Florida slash pine	45	
Chobee	2w	Severe	Moderate	Slight	Severe	Slash pine[3]	90	Slash pine,[4] South Florida slash pine.[4]
						Longleaf pine[3]	70	
						South Florida slash pine[3]	55	
28: Holopaw	3w	Moderate	Severe	Slight	Moderate	Slash pine	80	Slash pine, South Florida slash pine.
						Longleaf pine	70	
						South Florida slash pine	45	
34: Wauchula	3w	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine, South Florida slash pine.
						Longleaf pine	65	
						South Florida slash pine	45	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	
35------------------ Farmton	3w	Moderate	Slight	Slight	Moderate	Slash pine---------- Longleaf pine------- South Florida slash pine -------------- Live oak------------	80 70 45 ---	Slash pine, South Florida slash pine.
38------------------ St. Lucie	5s	Severe	Moderate	Slight	Slight	Sand pine-----------	60	Sand pine.
39------------------ Bradenton	2w	Moderate	Moderate	Slight	Moderate	Slash pine---------- Longleaf pine------- South Florida slash pine --------------	90 75 55	Slash pine, South Florida slash pine.

[1] The site index for South Florida slash pine is based on an age of 25 years, and that for all other species is based on an age of 50 years.

[2] Limitation is moderate where surface drainage is adequate.

[3] Potential productivity is attainable only where surface drainage is adequate.

[4] Planting is feasible only where surface drainage is adequate.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1. Adamsville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
2. Zolfo	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
3. Ft. Green	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness.	Severe: wetness.	Severe: wetness.
4. Apopka	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
5. Tavares	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
6. Candler	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
7. Basinger	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
8. Bradenton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
9. Popash	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
10. Pomona	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
11. Felda	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
12. Felda	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, droughty, flooding.
13. Floridana	Severe: ponding, percs slowly, too sandy.	Severe: ponding, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: ponding, too sandy.	Severe: ponding.
15. Immokalee	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
16. Myakka	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
17. Smyrna	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
18: Cassia	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty.
19: Ona	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
20: Samsula	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
21: Placid	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
22: Pomello	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
23: Sparr	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty.
24: Jonathan	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
25: Wabasso	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness.
26: Electra	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
27:					
Bradenton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Felda	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, droughty, flooding.
Chobee	Severe: flooding, wetness.	Severe: wetness, percs slowly.	Severe: wetness, flooding, percs slowly.	Severe: wetness.	Severe: wetness, flooding.
28: Holopaw	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
29. Pits					
30: Hontoon	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: ponding, excess humus.
31: Pompano	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, droughty, flooding.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
32: Felda	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
33: Manatee	Sévere: ponding, too sandy.	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: ponding.
34: Wauchula	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: wetness.
35: Farmton	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
36: Kaliga	Severe: ponding, excess humus, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: excess humus, ponding, percs slowly.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
37: Basinger	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
38: St. Lucie	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
39: Bradenton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
1-------------------- Adamsville	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor
2-------------------- Zolfo	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor
3-------------------- Ft. Green	Poor	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Poor
4-------------------- Apopka	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Poor	Very poor.
5-------------------- Tavares	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
6-------------------- Candler	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
7-------------------- Basinger	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair
8-------------------- Bradenton	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Poor
9-------------------- Popash	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
10------------------- Pomona	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair
11, 12-------------- Felda	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair
13------------------- Floridana	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
15------------------- Immokalee	Poor	Poor	Fair	Poor	Poor	Fair	Poor	Poor	Poor	Poor
16------------------- Myakka	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor
17------------------- Smyrna	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair
18------------------- Cassia	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
19------------------- Ona	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair
20------------------- Samsula	Very poor.	Very poor.	Poor	Fair	Very poor.	Good	Good	Very poor.	Poor	Good
21------------------- Placid	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
22------------------- Pomello	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
23------------------- Sparr	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
24------------------- Jonathan	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
25----------------- Wabasso	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair	Poor
26----------------- Electra	Poor	Poor	Fair	Poor	Poor	Poor	Poor	Poor	Poor	Poor
27:										
Bradenton----------	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Poor
Felda--------------	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair
Chobee-------------	Poor	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good
28----------------- Holopaw	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair
29. Pits										
30----------------- Hontoon	Very poor.	Very poor.	Poor	Fair	Very poor.	Good	Good	Very poor.	Fair	Good
31----------------- Pompano	Very poor.	Very poor.	Poor	Fair	Poor	Fair	Fair	Very poor.	Poor	Fair
32----------------- Felda	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
33----------------- Manatee	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
34----------------- Wauchula	Poor	Poor	Fair	Poor	Poor	Poor	Poor	Poor	Poor	Poor
35----------------- Farmton	Poor	Poor	Fair	Poor	Fair	Poor	Poor	Poor	Fair	Poor
36----------------- Kaliga	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good
37----------------- Basinger	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
38----------------- St. Lucie	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
39----------------- Bradenton	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Poor

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1. Adamsville	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty, too sandy.
2. Zolfo	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty, too sandy.
3. Ft. Green	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
4. Apopka	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
5. Tavares	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
6. Candler	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
7. Basinger	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8. Bradenton	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
9. Popash	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
10. Pomona	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
11. Felda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
12. Felda	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty, flooding.
13. Floridana	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
15. Immokalee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
16. Myakka	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
17. Smyrna	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
18. Cassia	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
19----------------- Ona	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
20----------------- Samsula	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
21----------------- Placid	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
22----------------- Pomello	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
23----------------- Sparr	Severe: cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
24----------------- Jonathan	Severe: cutbanks cave.	Slight-----------	Moderate: wetness.	Slight-----------	Slight-----------	Severe: droughty.
25----------------- Wabasso	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
26----------------- Electra	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
27:						
Bradenton----------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Felda--------------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty, flooding.
Chobee-------------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
28----------------- Holopaw	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
29. Pits						
30----------------- Hontoon	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: low strength, ponding.	Severe: ponding, excess humus.
31----------------- Pompano	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty, flooding.
32----------------- Felda	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
33----------------- Manatee	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
34----------------- Wauchula	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
35----------------- Farmton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
36----------------- Kaliga	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding, shrink-swell.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
37----------------- Basinger	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
38----------------- St. Lucie	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.
39----------------- Bradenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1------------------- Adamsville	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
2------------------- Zolfo	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
3------------------- Ft. Green	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
4------------------- Apopka	Slight-----------	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
5------------------- Tavares	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
6------------------- Candler	Slight-----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
7------------------- Basinger	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
8------------------- Bradenton	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
9------------------- Popash	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
10------------------ Pomona	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
11------------------ Felda	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
12------------------ Felda	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
13------------------ Floridana	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: ponding.	Severe: ponding, seepage.	Poor: ponding.
15------------------ Immokalee	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
16: Myakka	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
17: Smyrna	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
18: Cassia	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
19: Ona	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
20: Samsula	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
21: Placid	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
22: Pomello	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
23: Sparr	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
24: Jonathan	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
25: Wabasso	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness.	Poor: seepage, too sandy, wetness.
26: Electra	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
27:					
Bradenton	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Felda	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Chobee	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
28----------------- Holopaw	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
29. Pits					
30----------------- Hontoon	Severe: ponding, poor filter.	Severe: excess humus, seepage, ponding.	Severe: excess humus, seepage, ponding.	Severe: seepage, ponding.	Poor: excess humus, ponding.
31----------------- Pompano	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
32----------------- Felda	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
33----------------- Manatee	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
34----------------- Wauchula	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
35----------------- Farmton	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
36----------------- Kaliga	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too clayey.	Severe: seepage, ponding.	Poor: too clayey, hard to pack, ponding.
37----------------- Basinger	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
38----------------- St. Lucie	Slight-----------	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
39----------------- Bradenton	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1 Adamsville	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
2 Zolfo	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
3 Ft. Green	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
4 Apopka	Good	Probable	Improbable: too sandy.	Poor: too sandy.
5 Tavares	Good	Probable	Improbable: too sandy.	Poor: too sandy.
6 Candler	Good	Probable	Improbable: too sandy.	Poor: too sandy.
7 Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
8 Bradenton	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
9 Popash	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
10 Pomona	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
11, 12 Felda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
13 Floridana	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
15 Immokalee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
16 Myakka	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
17 Smyrna	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
18 Cassia	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
19 Ona	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
20 Samsula	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
21. Placid	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
22. Pomello	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
23. Sparr	Fair: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
24. Jonathan	Good	Probable	Improbable: too sandy.	Poor: too sandy.
25. Wabasso	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
26. Electra	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
27:				
Bradenton	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Felda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Chobee	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: wetness.
28. Holopaw	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
29. Pits				
30. Hontoon	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess humus.
31. Pompano	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
32. Felda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
33. Manatee	Poor: ponding.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, ponding.
34. Wauchula	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
35. Farmton	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
36. Kaliga	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
37: Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
38: St. Lucie	Good	Probable	Improbable: too sandy.	Poor: too sandy.
39: Bradenton	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Grassed waterways
1----------------- Adamsville	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
2----------------- Zolfo	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
3----------------- Ft. Green	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Wetness, cutbanks cave, percs slowly.	Wetness, fast intake, soil blowing.	Wetness.
4----------------- Apopka	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
5----------------- Tavares	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
6----------------- Candler	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
7----------------- Basinger	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
8----------------- Bradenton	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave, flooding.	Wetness, droughty, fast intake.	Wetness, droughty.
9----------------- Popash	Severe: seepage.	Severe: seepage, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, fast intake, soil blowing.	Wetness.
10---------------- Pomona	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
11---------------- Felda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
12---------------- Felda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
13---------------- Floridana	Severe: seepage.	Severe: ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, fast intake, soil blowing.	Wetness, percs slowly.
15---------------- Immokalee	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
16---------------- Myakka	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
17----------------- Smyrna	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
18----------------- Cassia	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
19----------------- Ona	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
20----------------- Samsula	Severe: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, subsides.	Ponding, soil blowing.	Wetness.
21----------------- Placid	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, fast intake, soil blowing.	Wetness.
22----------------- Pomello	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
23----------------- Sparr	Severe: seepage, wetness.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
24----------------- Jonathan	Severe: seepage.	Severe: seepage, piping.	Severe: slow refill, cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
25----------------- Wabasso	Severe: seepage.	Severe: seepage, wetness.	Severe: slow refill.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
26----------------- Electra	Severe: seepage.	Severe: seepage, piping.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty.
27:						
Bradenton---------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave, flooding.	Wetness, droughty, fast intake.	Wetness, droughty.
Felda-------------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
Chobee------------	Slight----------	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, soil blowing.	Wetness, rooting depth, percs slowly.
28----------------- Holopaw	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
29. Pits						
30----------------- Hontoon	Severe: seepage.	Severe: excess humus, ponding.	Slight: favorable.	Subsides, ponding.	Ponding, soil blowing.	Wetness.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
31----------------- Pompano	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
32----------------- Felda	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
33----------------- Manatee	Moderate: seepage.	Severe: ponding.	Severe: cutbanks cave.	Ponding---------	Ponding, fast intake, soil blowing.	Wetness.
34----------------- Wauchula	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Percs slowly---	Wetness, fast intake, soil blowing.	Wetness, erodes easily, percs slowly.
35----------------- Farmton	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
36----------------- Kaliga	Severe: seepage.	Severe: thin layer, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, subsides.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.
37----------------- Basinger	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
38----------------- St. Lucie	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty.
39----------------- Bradenton	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1----------------- Adamsville	0-7	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	7-80	Fine sand, sand	SP-SM, SP	A-3, A-2-4	0	100	100	90-100	2-12	---	NP
2----------------- Zolfo	0-7	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	7-63	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-18	---	NP
	63-80	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-18	---	NP
3----------------- Ft. Green	0-17	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	90-99	2-12	---	NP
	17-31	Cobbly fine sand, fine sand, sand.	SP, SP-SM	A-3, A-2-4	0-20	95-100	95-100	75-90	2-12	---	NP
	31-42	Cobbly fine sandy loam, cobbly sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	15-30	90-100	90-100	60-75	15-35	<40	NP-15
	42-80	Fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4	0	100	100	90-100	15-30	<35	NP-10
4----------------- Apopka	0-55	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	3-10	---	NP
	55-82	Sandy loam, sandy clay loam, sandy clay.	SM-SC, SC	A-2-4, A-2-6, A-4, A-6	0	98-100	95-100	60-95	20-40	20-40	4-20
5----------------- Tavares	0-7	Fine sand--------	SP, SP-SM	A-3	0	100	95-100	85-100	2-10	---	NP
	7-80	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	85-100	2-10	---	NP
6----------------- Candler	0-48	Fine sand--------	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	48-80	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	95-100	75-100	5-12	---	NP
7----------------- Basinger	0-14	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	14-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
8----------------- Bradenton	0-4	Loamy fine sand	SM	A-2-4	0	100	100	80-100	13-25	---	NP
	4-19	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-14	---	NP
	19-40	Sandy loam, fine sandy loam, loamy fine sand.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-100	20-35	<40	NP-18
	40-80	Fine sand, loamy fine sand, fine sandy loam.	SP-SM, SM, SM-SC, SC	A-3, A-2-4, A-2-6	0	100	100	80-100	5-35	<40	NP-18
9----------------- Popash	0-10	Mucky fine sand	SP-SM, SM, SM-SC	A-3, A-2-4	0	100	100	95-100	5-20	<20	NP-5
	10-21	Fine sand, sand, loamy sand.	SP-SM, SM, SM-SC	A-3, A-2-4	0	100	100	95-100	5-20	<20	NP-5
	21-52	Fine sand, sand	SP-SM	A-3, A-2-4	0	100	100	95-100	5-12	---	NP
	52-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	95-100	20-35	<40	NP-15

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
10---------------- Pomona	0-3	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	3-27	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	27-46	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-15	---	NP
	46-57	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	57-80	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC	A-2, A-4, A-6	0	100	95-100	85-100	25-50	25-40	4-16
11---------------- Felda	0-31	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-99	2-7	---	NP
	31-58	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	58-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
12---------------- Felda	0-26	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-99	2-7	---	NP
	26-48	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	48-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
13---------------- Floridana	0-15		SP-SM, SM	A-3, A-2-4	0	100	100	80-90	5-25	---	NP
	15-32	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	32-80	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	85-95	20-35	20-30	7-16
15---------------- Immokalee	0-5	Fine sand--------	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	5-44	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	44-60	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-21	---	NP
	60-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
16---------------- Myakka	0-20	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	20-33	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	33-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
17---------------- Smyrna	0-16	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-12	---	NP
	16-24	Sand, fine sand	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
	24-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
18---------------- Cassia	0-27	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	2-7	---	NP
	27-34	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-20	---	NP
	34-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
19---------------- Ona	0-9	Fine sand--------	SP-SM, SP	A-3	0	100	100	85-95	3-10	---	NP
	9-16	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-20	---	NP
	16-80	Fine sand, sand	SP-SM, SP	A-3	0	100	100	85-95	3-10	---	NP
20---------------- Samsula	0-25	Muck-------------	PT	---	---	---	---	---	---	---	---
	25-80	Sand, fine sand, loamy sand.	SP-SM, SM, SP	A-3, A-2-4	0	100	100	80-100	2-20	---	NP
21---------------- Placid	0-18	Fine sand--------	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	1-20	---	NP
	18-80	Sand, fine sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	1-20	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
22----------------- Pomello	0-46	Fine sand--------	SP, SP-SM	A-3	0	100	100	60-100	1-8	---	NP
	46-58	Coarse sand, sand, fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	60-100	6-15	---	NP
	58-80	Coarse sand, sand, fine sand.	SP, SP-SM	A-3	0	100	100	60-100	4-10	---	NP
23----------------- Sparr	0-6	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	75-95	5-14	---	NP
	6-60	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	75-95	5-14	---	NP
	60-67	Sandy loam, sandy clay loam, fine sandy loam.	SM-SC, SC, SM	A-2-4	0	100	100	75-97	25-35	<30	NP-10
	67-80	Sandy clay, sandy clay loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	95-100	75-95	30-50	22-40	5-15
24----------------- Jonathan	0-6	Sand--------------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-64	Fine sand, sand	SP	A-3	0	100	100	85-100	1-4	---	NP
	64-80	Fine sand, sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-15	---	NP
25----------------- Wabasso	0-24	Fine sand--------	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	24-32	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
	32-37	Sand, fine sand	SP, SP-SM	A-3	0	100	100	95-100	2-10	---	NP
	37-70	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC	A-2-4, A-2-6	0	100	100	95-100	20-35	20-30	5-13
	70-80	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	---	NP
26----------------- Electra	0-4	Sand--------------	SP, SP-SM	A-3	0	100	95-100	75-99	3-10	---	NP
	4-42	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	75-99	3-10	---	NP
	42-66	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-99	8-15	---	NP
	66-80	Sandy clay loam, sandy clay, fine sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	80-99	20-45	20-40	4-20
27:											
Bradenton--------	0-6	Loamy fine sand	SM	A-2-4	0	100	100	80-100	13-25	---	NP
	6-16	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	80-100	5-12	---	NP
	16-80	Sandy loam, fine sandy loam, loamy fine sand.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-100	20-35	<40	4-18
Felda------------	0-8	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	8-55	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	55-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
Chobee-----------	0-26	Fine sandy loam	SP-SM, SM	A-2-4	0	100	100	85-99	12-25	<40	NP-10
	26-48	Sandy clay loam	SC	A-2-6, A-2-7, A-6, A-7	0	100	100	85-99	25-45	35-45	20-25
	48-80	Loamy sand, fine sand, sandy clay loam.	SP-SM, SM, SC, SM-SC	A-2-4, A-2-6, A-6, A-7	0	100	100	80-99	12-45	<45	NP-25
28----------------- Holopaw	0-63	Fine sand--------	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	63-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SM-SC	A-2-4	0	100	95-100	70-99	15-30	<25	NP-7
29. Pits											

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map sybmol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
30---------------- Hontoon	0-60	Muck--------------	PT	---	0	---	---	---	---	---	---
	60-70	Mucky sand, sand	SP, SP-SM	A-3	0	100	100	80-95	2-8	---	NP
31---------------- Pompano	0-4	Fine sand---------	SP, SP-SM	A-3, A-2-4	0	100	100	75-100	1-12	---	NP
	4-80	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	75-100	1-12	---	NP
32---------------- Felda	0-26	Fine sand---------	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	26-48	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	48-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
33---------------- Manatee	0-14	Fine sand---------	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	8-15	---	NP
	14-80	Fine sandy loam, sandy loam.	SM-SC, SC, SM	A-2-4	0	100	100	90-100	18-30	<30	NP-10
34---------------- Wauchula	0-6	Fine sand---------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	6-22	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	22-34	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	8-25	---	NP
	34-38	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-20	---	NP
	38-50	Fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6	0	100	92-100	90-100	25-50	<40	NP-20
	50-80	Loamy fine sand, fine sandy loam.	SM, SM-SC	A-2-4	0	100	95-100	85-100	15-25	<26	NP-8
35---------------- Farmton	0-6	Fine sand---------	SP, SP-SM, SM	A-3, A-2-4	0	100	100	80-99	2-16	---	NP
	6-34	Fine sand, sand	SP, SP-SM	A-3	0	100	100	80-99	2-7	---	NP
	34-61	Fine sand, sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-99	5-20	---	NP
	61-80	Fine sandy loam, sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	80-99	15-35	<35	NP-15
36---------------- Kaliga	0-25		PT	---	---	---	---	---	---	---	---
	25-35	Loam, fine sandy loam, loamy sand.	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6	0	100	100	90-100	13-50	<40	NP-15
	35-60	Sandy clay, clay, sandy clay loam.	SC, CL, CH	A-7, A-4, A-6	0	100	100	75-100	36-85	20-73	8-40
	60-80	Fine sandy loam, sandy loam, loamy sand.	SM, SM-SC	A-2-4	0	100	100	75-100	13-35	<28	NP-7
37---------------- Basinger	0-27	Fine sand---------	SP	A-3	0	100	100	85-100	1-4	---	NP
	27-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
38---------------- St. Lucie	0-80	Fine sand---------	SP	A-3	0	100	100	85-99	1-4	---	NP
39---------------- Bradenton	0-4	Loamy fine sand	SM	A-2-4	0	100	100	80-100	13-25	---	NP
	4-13	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	80-100	5-12	---	NP
	13-27	Sandy loam, fine sandy loam, loamy fine sand.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-100	20-35	<40	4-18
	27-80	Fine sand, loamy fine sand, fine sandy loam.	SP-SM, SM, SM-SC, SC	A-3, A-2-4, A-2-6	0	100	100	80-100	5-35	<40	NP-18

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Reaction	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
1---------------- Adamsville	0-7	2-8	1.37-1.44	6.0-20	0.05-0.10	4.5-7.8	0.10	5	2	<1
	7-80	1-7	1.49-1.58	6.0-20	0.03-0.08	4.5-7.8	0.10			
2---------------- Zolfo	0-7	1-5	1.40-1.55	6.0-20	0.10-0.15	4.5-7.3	0.10	5	2	0.5-1
	7-63	1-5	1.50-1.60	6.0-20	0.03-0.10	4.5-7.3	0.10			
	63-80	1-5	1.50-1.70	0.6-2.0	0.10-0.25	3.6-6.5	0.15			
3---------------- Ft. Green	0-17	2-5	1.25-1.55	6.0-20	0.10-0.15	5.1-7.3	0.10	5	2	3-6
	17-31	2-5	1.45-1.60	6.0-20	0.02-0.10	5.1-7.3	0.10			
	31-42	13-30	1.50-1.65	0.06-0.6	0.10-0.15	5.6-7.3	0.15			
	42-80	13-30	1.50-1.65	0.06-0.6	0.12-0.18	5.6-7.3	0.24			
4---------------- Apopka	0-55	0-3	1.45-1.60	6.0-20	0.03-0.05	4.5-6.0	0.10	5	2	<2
	55-82	18-37	1.55-1.75	0.6-2.0	0.12-0.17	4.5-6.0	0.24			
5---------------- Tavares	0-7	0-4	1.25-1.60	6.0-20	0.05-0.10	3.6-6.0	0.10	5	2	0.5-2
	7-80	0-4	1.40-1.70	6.0-20	0.02-0.05	3.6-6.0	0.10			
6---------------- Candler	0-48	<3	1.35-1.55	>20	0.02-0.05	4.5-6.0	0.10	5	2	<1
	48-80	3-8	1.50-1.65	6.0-20	0.05-0.08	4.5-6.0	0.10			
7---------------- Basinger	0-14	0.5-4	1.40-1.55	>20	0.03-0.07	3.6-8.4	0.10	5	2	0.5-2
	14-30	1-6	1.40-1.65	>20	0.10-0.15	3.6-7.3	0.10			
	30-80	1-3	1.50-1.70	>20	0.05-0.10	3.6-7.3	0.10			
8---------------- Bradenton	0-4	7-13	1.30-1.50	6.0-20	0.10-0.15	5.6-7.8	0.15	5	2	2-8
	4-19	1-6	1.50-1.70	6.0-20	0.03-0.07	5.6-7.3	0.20			
	19-40	10-18	1.55-1.70	0.6-2.0	0.10-0.15	6.1-8.4	0.24			
	40-80	1-18	1.55-1.70	0.6-6.0	0.03-0.10	7.4-8.4	0.24			
9---------------- Popash	0-10	3-13	1.25-1.45	6.0-20	0.15-0.25	3.6-6.5	0.10	5	2	6-12
	10-21	3-13	1.35-1.45	6.0-20	0.10-0.15	3.6-6.5	0.10			
	21-52	1-7	1.50-1.65	6.0-20	0.05-0.08	5.6-7.3	0.10			
	52-80	13-30	1.45-1.60	<0.2	0.10-0.15	5.6-7.3	0.24			
10--------------- Pomona	0-3	1-6	1.20-1.50	6.0-20	0.05-0.10	3.6-5.5	0.10	5	2	1-2
	3-27	1-6	1.45-1.70	6.0-20	0.03-0.08	3.6-5.5	0.10			
	27-46	2-7	1.30-1.60	0.6-2.0	0.10-0.15	3.6-5.5	0.15			
	46-57	1-6	1.40-1.60	6.0-20	0.03-0.08	3.6-5.5	0.10			
	57-80	16-36	1.50-1.70	0.2-0.6	0.13-0.17	3.6-5.5	0.20			
11--------------- Felda	0-31	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	0.10	5	2	1-4
	31-58	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.6-7.8	0.24			
	58-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.6-8.4	0.10			
12--------------- Felda	0-26	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	0.10	5	2	1-4
	26-48	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.6-7.8	0.24			
	48-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.6-8.4	0.10			
13--------------- Floridana	0-15	3-10	1.40-1.49	6.0-20	0.10-0.20	4.5-8.4	0.10	5	2	6-15
	15-32	1-7	1.52-1.53	6.0-20	0.05-0.10	4.5-8.4	0.10			
	32-80	15-30	1.60-1.69	<0.2	0.10-0.20	4.5-8.4	0.24			
15--------------- Immokalee	0-5	1-5	1.20-1.50	6.0-20	0.05-0.10	3.6-6.0	0.10	5	2	1-2
	5-44	1-5	1.45-1.70	6.0-20	0.02-0.05	3.6-6.0	0.10			
	44-60	2-7	1.30-1.60	0.6-2.0	0.10-0.25	3.6-6.0	0.15			
	60-80	1-5	1.40-1.60	6.0-20	0.02-0.05	3.6-6.0	0.10			
16--------------- Myakka	0-20	<2	1.36-1.44	6.0-20	0.02-0.05	3.6-6.5	0.10	5	2	1-2
	20-33	2-8	1.47-1.59	0.6-6.0	0.10-0.15	3.6-6.5	0.15			
	33-80	<2	1.48-1.61	6.0-20	0.02-0.05	3.6-6.5	0.10			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Reaction	Erosion factors		Wind erodi- bility group	Organic matter
							K	T		
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
17----------------- Smyrna	0-16	1-6	1.35-1.45	6.0-20	0.03-0.07	3.6-7.3	0.10	5	2	1-5
	16-24	3-8	1.35-1.45	0.6-6.0	0.10-0.15	3.6-7.3	0.15			
	24-80	1-6	1.50-1.65	6.0-20	0.03-0.07	4.5-5.5	0.10			
18----------------- Cassia	0-27	1-4	1.30-1.55	6.0-20	0.03-0.07	4.5-6.0	0.10	5	2	<1
	27-34	2-10	1.30-1.55	0.6-6.0	0.10-0.15	4.5-6.0	0.15			
	34-80	1-5	1.40-1.60	6.0-20	0.03-0.07	4.5-6.0	0.10			
19----------------- Ona	0-9	1-7	1.40-1.55	6.0-20	0.10-0.15	3.6-6.0	0.10	5	2	1-5
	9-16	3-8	1.50-1.65	0.6-2.0	0.10-0.15	3.6-6.0	0.15			
	16-80	1-4	1.50-1.65	6.0-20	0.03-0.08	3.6-6.0	0.10			
20----------------- Samsula	0-25	---	0.25-0.50	6.0-20	0.20-0.25	4.5-5.5	----	---	2	>20
	25-80	1-14	1.35-1.55	6.0-20	0.02-0.05	3.6-5.5	0.17			
21----------------- Placid	0-18	<10	1.20-1.40	6.0-20	0.15-0.20	3.6-5.5	0.10	5	2	2-10
	18-80	<10	1.30-1.60	6.0-20	0.05-0.08	3.6-5.5	0.10			
22----------------- Pomello	0-46	<2	1.35-1.65	>20	0.02-0.05	4.5-6.0	0.10	5	1	<1
	46-58	<2	1.45-1.60	2.0-6.0	0.10-0.15	4.5-6.0	0.15			
	58-80	<2	1.35-1.65	6.0-20	0.02-0.05	4.5-6.0	0.10			
23----------------- Sparr	0-6	1-5	1.20-1.50	6.0-20	0.08-0.12	4.5-6.5	0.10	5	2	1-3
	6-60	1-5	1.55-1.70	6.0-20	0.05-0.08	4.5-6.5	0.20			
	60-67	15-32	1.55-1.70	0.6-2.0	0.11-0.15	4.5-6.5	0.24			
	67-80	15-38	1.55-1.75	0.6-2.0	0.15-0.18	4.5-6.5	0.24			
24----------------- Jonathan	0-6	<0-3	1.30-1.55	6.0-20	0.05-0.08	4.5-5.5	0.10	5	2	1-2
	6-64	<0-3	1.40-1.70	6.0-20	0.01-0.05	5.1-6.0	0.24			
	64-80	1-8	1.55-1.75	<0.2	0.10-0.15	3.6-5.0	0.28			
25----------------- Wabasso	0-24	<5	1.25-1.55	6.0-20	0.02-0.05	4.5-6.5	0.10	5	2	1-4
	24-32	1-12	1.50-1.75	0.6-2.0	0.10-0.15	4.5-7.3	0.15			
	32-37	2-5	1.40-1.55	6.0-20	0.02-0.05	5.1-8.4	0.10			
	37-70	12-30	1.60-1.80	<0.2	0.10-0.15	5.1-8.4	0.24			
	70-80	2-12	1.40-1.70	6.0-20	0.05-0.10	7.4-8.4	0.10			
26----------------- Electra	0-4	1-6	1.40-1.55	6.0-20	0.05-0.10	3.6-6.5	0.10	5	2	1-2
	4-42	1-6	1.45-1.70	6.0-20	0.02-0.07	3.6-6.5	0.10			
	42-66	1-6	1.50-1.70	0.6-2.0	0.10-0.15	3.6-5.5	0.15			
	66-80	18-38	1.60-1.75	<0.2	0.10-0.15	3.6-5.5	0.28			
27:										
Bradenton--------	0-6	7-13	1.30-1.50	6.0-20	0.10-0.15	5.6-7.8	0.15	5	2	2-8
	6-16	1-6	1.50-1.70	6.0-20	0.03-0.07	5.6-7.3	0.20			
	16-80	10-18	1.55-1.70	0.6-2.0	0.10-0.15	6.1-8.4	0.24			
Felda------------	0-8	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	0.10	5	2	1-4
	8-55	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.6-7.8	0.24			
	55-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.6-8.4	0.10			
Chobee-----------	0-26	7-20	1.45-1.50	2.0-6.0	0.10-0.15	6.1-7.3	0.15	5	3	2-7
	26-48	20-35	1.55-1.75	<0.2	0.12-0.17	7.4-8.4	0.32			
	48-80	7-20	1.60-1.75	0.2-6.0	0.06-0.10	7.4-8.4	0.20			
28----------------- Holopaw	0-63	1-7	1.35-1.60	6.0-20	0.07-0.10	5.1-7.3	0.10	5	2	1-4
	63-80	13-28	1.60-1.70	0.2-2.0	0.15-0.20	5.1-8.4	0.20			
29. Pits										
30----------------- Hontoon	0-60	---	0.22-0.38	6.0-20	0.20-0.25	4.5-5.5	----	---	2	>75
	60-70	1-5	1.30-1.55	6.0-20	0.15-0.20	4.5-5.5	0.15			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Reaction	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
31---------------- Pompano	0-4	<1-8	1.20-1.50	>20	0.02-0.05	4.5-7.8	0.10	5	2	1-4
	4-80	<1-8	1.45-1.65	>20	0.02-0.05	4.5-7.8	0.10			
32---------------- Felda	0-26	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	0.10	4	2	1-4
	26-48	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.6-7.8	0.24			
	48-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.6-8.4	0.17			
33---------------- Manatee	0-14	2-8	1.20-1.40	2.0-6.0	0.15-0.20	5.6-7.8	0.10	5	2	4-15
	14-80	10-20	1.50-1.65	0.6-2.0	0.10-0.15	6.6-8.4	0.24			
34---------------- Wauchula	0-6	<2	1.25-1.45	6.0-20	0.08-0.15	3.6-5.5	0.10	5	2	1-2
	6-22	<2	1.45-1.60	6.0-20	0.02-0.10	3.6-5.5	0.10			
	22-34	2-8	1.45-1.60	0.2-6.0	0.15-0.25	3.6-5.5	0.15			
	34-38	<2	1.45-1.65	2.0-6.0	0.08-0.10	4.5-5.5	0.10			
	38-50	15-30	1.60-1.70	0.06-0.6	0.11-0.17	4.5-5.5	0.20			
	50-80	11-20	1.60-1.75	0.06-0.6	0.15-0.20	4.5-5.5	0.15			
35---------------- Farmton	0-6	1-4	1.35-1.50	6.0-20	0.08-0.20	3.6-5.5	0.10	5	2	1-2
	6-34	1-4	1.50-1.65	6.0-20	0.02-0.10	3.6-5.5	0.10			
	34-61	2-7	1.55-1.70	0.6-2.0	0.10-0.25	3.6-5.5	0.15			
	61-80	12-27	1.60-1.70	<0.2	0.10-0.17	3.6-5.5	0.24			
36---------------- Kaliga	0-25	---	0.15-0.35	6.0-20	0.20-0.25	3.6-4.4	----	---	2	50-97
	25-35	8-27	1.50-1.65	0.6-6.0	0.10-0.15	4.5-7.3	0.24			
	35-60	30-70	1.60-1.65	<0.2	0.10-0.20	4.5-7.3	0.32			
	60-80	8-20	1.50-1.65	2.0-20	0.10-0.15	4.5-7.3	0.20			
37---------------- Basinger	0-32	0.5-4	1.40-1.55	>20	0.03-0.07	3.6-7.3	0.10	5	2	0.2-1
	32-55	1-6	1.40-1.65	>20	0.10-0.15	3.6-7.3	0.10			
	55-80	1-3	1.50-1.70	>20	0.05-0.10	3.6-7.3	0.10			
38---------------- St. Lucie	0-80	<2	1.50-1.60	>20	0.02-0.05	3.6-7.3	0.10	5	1	<1
39---------------- Bradenton	0-4	7-13	1.30-1.50	6.0-20	0.10-0.15	5.6-7.8	0.15	5	2	2-8
	4-13	1-6	1.50-1.70	6.0-20	0.03-0.07	5.6-7.3	0.20			
	13-27	10-18	1.55-1.70	0.6-2.0	0.10-0.15	6.1-8.4	0.24			
	27-80	1-18	1.55-1.70	0.6-6.0	0.03-0.10	7.4-8.4	0.24			

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "frequent," "brief," and "apparent" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Map symbol and soil name	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Subsidence: Initial	Subsidence: Total	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In	In		
1 Adamsville	C	None	---	---	2.0-3.5	Apparent	Jun-Nov	---	---	Low	Moderate.
2 Zolfo	C	None	---	---	2.0-3.5	Apparent	Jun-Nov	---	---	Low	Moderate.
3 Ft. Green	D	None	---	---	0-1.0	Apparent	Jun-Sep	---	---	High	Moderate.
4 Apopka	A	None	---	---	>6.0	---	---	---	---	Moderate	High.
5 Tavares	A	None	---	---	3.5-6.0	Apparent	Jun-Dec	---	---	Low	High.
6 Candler	A	None	---	---	>6.0	---	---	---	---	Low	High.
7 Basinger	B/D	None	---	---	0-1.0	Apparent	Jun-Feb	---	---	High	Moderate.
8 Bradenton	D	Frequent	Brief	Jun-Nov	0-1.0	Apparent	Jun-Dec	---	---	High	Low.
9* Popash	D	None	---	---	+2-1.0	Apparent	Jun-Mar	---	---	Moderate	Moderate.
10 Pomona	B/D	None	---	---	0-1.0	Apparent	Jul-Sep	---	---	High	High.
11 Felda	B/D	None	---	---	0-1.0	Apparent	Jul-Mar	---	---	High	Moderate.
12 Felda	B/D	Frequent	Brief	Jul-Feb	0-1.0	Apparent	Jul-Mar	---	---	High	Moderate.
13* Floridana	B/D	None	---	---	+2-1.0	Apparent	Jun-Feb	---	---	Moderate	Low.
15 Immokalee	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	---	---	High	High.
16 Myakka	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	---	---	High	High.
17 Smyrna	B/D	None	---	---	0-1.0	Apparent	Jul-Oct	---	---	High	High.
18 Cassia	C	None	---	---	1.5-3.5	Apparent	Jul-Jan	---	---	Moderate	High.
19 Ona	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	---	---	High	High.
20* Samsula	B/D	None	---	---	+2-1.0	Apparent	Jan-Dec	16-20	30-36	High	High.
21* Placid	B/D	None	---	---	+2-1.0	Apparent	Jun-Mar	---	---	High	High.
22 Pomello	C	None	---	---	2.0-3.5	Apparent	Jul-Nov	---	---	Low	High.
23 Sparr	C	None	---	---	1.5-3.5	Apparent	Jul-Oct	---	---	Moderate	High.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
24----- Jonathan	B	None-----	---	---	3.0-5.0	Apparent	Jun-Oct	---	---	Low-----	High.
25----- Wabasso	B/D	None-----	---	---	0-1.0	Apparent	Jun-Oct	---	---	Moderate	High.
26----- Electra	C	None-----	---	---	2.0-3.5	Apparent	Jul-Oct	---	---	Low-----	High.
27:											
Bradenton-----	D	Frequent-----	Brief-----	Jun-Nov	0-1.0	Apparent	Jun-Dec	---	---	High-----	Low.
Felda-----	B/D	Frequent-----	Brief-----	Jul-Feb	0-1.0	Apparent	Jul-Mar	---	---	High-----	Moderate.
Chobee-----	B/D	Frequent-----	Brief to very long.	Jun-Feb	0-1.0	Apparent	Jun-Feb	---	---	Moderate	Low.
28----- Holopaw	B/D	None-----	---	---	0-1.0	Apparent	Jun-Nov	---	---	High-----	Moderate.
29. Pits											
30*----- Hontoon	B/D	None-----	---	---	+2-1.0	Apparent	Jan-Dec	16-24	>52	High-----	High.
31----- Pompano	D	Frequent-----	Brief-----	Jun-Nov	0-1.0	Apparent	Jun-Nov	---	---	High-----	Moderate.
32*----- Felda	D	None-----	---	---	+2-1.0	Apparent	Jun-Dec	---	---	High-----	High.
33*----- Manatee	B/D	None-----	---	---	+2-1.0	Apparent	Jun-Feb	---	---	High-----	Low.
34----- Wauchula	B/D	None-----	---	---	0-1.0	Apparent	Jun-Feb	---	---	High-----	High.
35----- Farmton	B/D	None-----	---	---	0-1.0	Apparent	Jun-Oct	---	---	High-----	High.
36*----- Kaliga	B/D	None-----	---	---	+2-0	Apparent	Jun-Apr	16-20	24-45	High-----	High.
37*----- Basinger	B/D	None-----	---	---	+2-1.0	Apparent	Jun-Feb	---	---	High-----	Moderate.
38----- St. Lucie	A	None-----	---	---	>6.0	---	---	---	---	Low-----	Moderate.
39----- Bradenton	B/D	None-----	---	---	0-1.0	Apparent	Jun-Dec	---	---	High-----	Low.

* In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 17.--DEPTH TO WATER TABLE IN SELECTED SOILS

[Monthly readings were based on the average of two readings per month. Absence of an entry indicates that readings were not taken that month. There was a deficit of about 6 inches of rainfall per year during the period 1978-80. Consequently, the data are inadequate for a statistical base; however, they were considered along with other water table readings in developing the depth to the water table for the soils listed]

Soils	Elevation above mean sea level	Year	Month											
			January	February	March	April	May	June	July	August	September	October	November	December
	Ft		In	In	In	In	In	In	In	In	In	In	In	In
Cassia	95	1978	--	--	--	80	75	71	54	52	66	62	74	73
		1979	37	48	50	65	59	61	45	37	29	30	57	65
		1980	73	65	62	53	66	62	70	72	70	72	72	72
		Mean	55	57	56	66	67	65	56	54	55	55	68	70
Myakka	70	1978	--	--	--	78	75	48	26	33	50	56	70	68
		1979	34	44	38	60	54	60	46	21	16	28	49	56
		1980	61	46	40	33	48	38	50	40	25	40	56	56
		Mean	48	45	39	57	59	49	41	31	30	41	58	60
Ona	85	1978	--	--	--	60	59	38	20	25	44	56	60	60
		1979	33	38	37	57	54	60	49	15	17	25	46	42
		1980	46	38	35	26	47	35	44	38	15	37	54	54
		Mean	40	38	36	48	53	44	38	26	25	39	53	52
Pomona	83	1978	--	--	--	75	69	43	20	20	40	59	73	68
		1979	33	42	40	59	56	55	39	17	17	29	50	43
		1980	48	40	38	29	45	37	47	40	15	27	55	54
		Mean	41	41	39	54	57	45	35	26	24	38	59	55
Smyrna	85	1978	--	31	20	34	40	33	6	15	41	40	45	34
		1979	16	28	33	41	31	37	40	20	17	29	41	29
		1980	35	26	31	19	44	39	22	22	20	38	48	49
		Mean	26	26	28	31	38	36	23	19	26	36	45	37
Zolfo	125	1978	--	70	56	61	55	59	53	44	59	72	72	72
		1979	60	64	68	72	67	69	45	36	24	31	48	49
		1980	58	60	58	50	56	39	35	42	39	38	48	--
		Mean	59	65	61	61	59	56	44	41	41	47	56	61

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Particle-size distribution (mm): Sand						Silt	Clay	Saturated hydraulic conductivity	Bulk density (field moist)	Water content		
			Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.10)	Very fine (0.10-0.05)	Total (2.0-0.05)	(0.05-0.002)	(<0.002)			1/10 bar	1/3 bar	15 bar
	Cm										Cm/hr	G/cm^3	---Percent (wt)--		
Apopka fine sand:															
(S79FL-049-006)-1	0-20	Ap	0.0	1.7	17.7	56.9	18.8	95.1	2.0	2.9	6.9	1.57	9.4	5.5	2.3
-2	20-51	A21	0.1	2.3	20.0	54.8	17.8	95.0	2.9	2.1	19.4	1.52	7.2	4.2	1.9
-3	51-81	A22	0.0	2.0	15.5	56.0	21.9	95.4	2.3	2.3	24.8	1.50	6.7	4.1	1.6
-4	81-140	A23	0.0	2.3	17.9	56.6	20.0	96.8	1.8	1.4	21.2	1.56	5.3	2.8	1.0
-5	140-165	B1t	0.0	3.2	15.2	49.2	22.0	89.6	2.5	7.9	3.6	1.59	12.5	7.4	4.1
-6	165-178	B21t	0.0	1.6	12.2	36.8	16.2	66.8	4.4	28.8	0.1	1.57	21.5	19.4	12.9
-7	178-203	B22t	0.0	1.0	10.8	32.8	8.4	53.0	13.6	33.4	0.0	1.54	26.5	24.7	17.1
Bradenton loamy fine sand:															
(S80FL-049-016)-1	0-10	A1	0.0	0.6	10.2	47.0	28.2	86.0	5.3	8.7	17.1	1.17	29.0	22.6	6.6
-2	10-20	A21	0.0	1.6	15.7	49.0	28.1	94.4	4.3	1.3	16.8	1.38	9.3	5.2	1.2
-3	20-33	A22	0.0	3.6	17.9	49.0	26.1	96.2	2.9	0.9	12.8	1.52	6.6	2.7	0.6
-4	33-51	B21tg	0.0	3.1	14.1	41.3	19.6	78.1	4.1	17.8	0.6	1.57	22.2	20.1	11.0
-5	51-68	B22tgca	0.0	2.6	13.5	43.7	19.6	79.4	2.8	17.8	0.0	1.64	18.7	16.6	10.3
-6	68-91	C1ca	0.2	2.8	14.5	47.6	19.9	85.0	3.2	11.8	0.3	1.65	17.3	14.2	8.6
-7	91-142	C2ca	0.3	3.1	14.2	39.2	21.2	78.0	6.6	15.4	0.1	1.65	19.2	16.6	10.3
-8	142-193	C3ca	0.1	2.2	11.8	45.1	22.7	81.9	5.2	12.9	0.2	1.66	17.9	14.1	7.0
-9	193-203	C4ca	0.0	2.4	12.6	49.3	23.0	87.3	4.1	8.6	1.1	1.67	15.3	9.2	5.0
Cassia fine sand:															
(S78FL-049-004)-1	0-15	A1	0.0	0.6	5.7	57.2	29.8	93.9	5.7	0.4	79.5	1.33	6.5	4.2	2.2
-2	15-68	A2	0.1	3.0	30.9	49.2	13.7	96.9	2.8	0.3	28.6	1.54	3.2	1.8	1.0
-3	68-86	B21h	0.1	2.8	27.6	47.5	13.2	91.2	5.0	3.8	5.3	1.53	13.0	10.3	3.8
-4	86-107	B22h	0.1	3.3	30.4	48.9	11.7	94.4	3.8	1.8	9.3	1.58	9.9	7.0	1.7
-5	107-145	B31	0.1	3.0	31.0	49.3	12.7	96.1	2.9	1.0	10.3	1.65	8.0	5.0	0.9
-6	145-165	B32&B'h	0.1	3.0	29.5	49.3	13.0	94.9	3.7	1.4	2.9	1.74	12.4	8.1	1.3
-7	165-203	C	0.1	3.9	30.6	48.4	10.9	93.9	5.2	0.9	1.4	1.85	12.7	6.0	0.7
Electra sand:															
(S79FL-049-009)-1	0-10	Ap	0.1	3.6	26.2	45.0	21.4	96.3	2.4	1.3	11.5	1.53	7.0	4.7	2.5
-2	10-41	A21	0.0	3.2	25.0	47.0	21.3	96.5	2.8	0.7	15.4	1.56	5.0	3.5	2.4
-3	41-107	A22	0.1	3.3	24.0	46.6	23.1	97.0	2.4	0.6	17.4	1.52	4.9	2.7	1.8
-4	107-114	B21h	0.1	4.2	23.8	44.5	19.9	92.5	3.6	3.9	16.4	1.46	9.6	6.3	2.7
-5	114-137	B22h	0.2	3.4	21.4	45.5	22.2	92.7	3.4	3.9	14.1	1.43	9.7	6.6	2.9
-6	137-152	B23h	0.1	3.8	21.9	47.6	21.3	94.7	2.9	2.4	11.8	1.53	7.9	4.5	2.3
-7	152-168	B3&Bh	0.3	5.0	23.6	44.9	19.6	93.4	2.8	3.8	7.1	1.62	9.1	5.6	2.5
-8	168-183	B'21tg	0.2	4.5	21.7	35.0	16.9	78.3	5.2	16.5	0.0	1.65	18.8	16.9	10.2
-9	183-203	B'22tg	0.0	1.8	17.2	38.8	17.4	75.2	5.4	19.4	0.0	1.68	18.5	16.7	9.3

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution (mm): Sand: Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.10)	Very fine (0.10-0.05)	Total (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Saturated hydraulic conductivity	Bulk density (field moist)	Water content: 1/10 bar	1/3 bar	15 bar
	Cm										Cm/hr	G/cm^3	---Percent (wt)---		
Farmton fine sand:															
(S80FL-049-013)-1	0-15	Ap	0.0	1.1	12.8	45.2	34.7	93.8	4.9	1.3	4.3	1.25	24.9	17.3	4.8
-2	15-30	A21	0.0	1.0	11.6	43.6	40.0	96.2	2.8	1.0	9.3	1.57	7.3	3.0	0.9
-3	30-48	A22	0.0	1.0	11.2	40.9	43.6	96.7	2.3	1.0	9.3	1.60	10.1	4.7	0.6
-4	48-86	A23	0.1	1.1	10.4	40.7	44.8	97.1	2.9	0.0	9.6	1.62	7.2	2.9	0.7
-5	86-114	B21h	0.0	1.1	10.9	36.8	44.2	93.0	5.8	1.2	1.9	1.68	11.4	6.3	2.6
-6	114-140	B3	0.0	1.1	10.9	38.9	44.1	95.0	3.8	1.2	8.2	1.59	11.6	4.5	1.2
-7	140-155	B'h	0.1	1.3	10.9	41.1	41.2	94.6	2.9	2.5	0.7	1.70	18.0	8.6	2.2
-8	155-180	B'21tg	0.1	1.5	9.9	40.0	28.6	80.1	4.0	15.9	0.0	1.75	16.7	15.6	9.4
-9	180-203	B'22tg	0.0	1.2	10.9	37.2	27.1	76.4	2.7	20.9	0.0	1.76	16.2	15.3	10.7
Felda fine sand:															
(S79FL-049-011)-1	0-10	Ap	0.1	1.0	30.5	50.1	16.6	98.3	0.8	0.9	17.1	1.52	9.3	6.7	2.6
-2	10-28	A21	0.1	2.5	33.1	46.1	16.3	98.1	1.6	0.3	19.2	1.64	5.1	3.1	1.0
-3	28-53	A22	0.2	3.1	30.2	47.0	17.2	97.7	1.9	0.4	18.4	1.57	5.3	3.5	1.7
-4	53-79	A23	0.1	3.1	32.4	44.4	16.8	96.8	2.4	0.8	13.2	1.60	6.3	2.5	0.9
-5	79-112	B21t	0.2	3.2	28.3	39.0	13.7	84.4	4.6	11.0	0.1	1.68	19.6	17.3	7.7
-6	112-147	B22tg	0.2	3.3	30.1	37.0	13.5	84.1	4.9	11.0	0.1	1.79	16.8	13.5	6.1
-7	147-203	Cg	0.2	2.7	28.5	40.9	15.1	87.4	4.1	8.5	---	---	---	---	---
Ft. Green fine sand:															
(S79FL-049-008)-1	0-15	Ap	0.1	1.5	15.0	58.8	17.4	92.8	2.5	4.7	44.1	1.15	33.1	23.5	6.1
-2	15-43	A21	0.2	2.8	16.1	57.1	16.9	93.1	3.9	3.0	5.6	1.52	11.2	6.7	3.6
-3	43-79	A22	0.0	2.2	14.4	58.6	16.6	91.8	3.8	4.4	---	---	---	---	---
-4	79-107	B21tg	0.0	2.1	17.9	43.7	5.0	68.7	3.5	27.8	---	---	---	---	---
-5	107-132	B22tg	0.0	2.0	17.0	45.4	4.4	67.8	4.6	27.6	---	---	---	---	---
-6	132-203	B23tg	3.8	7.0	19.2	30.4	4.2	64.6	17.0	18.4	---	---	---	---	---
Jonathan sand:															
(S78FL-049-003)-1	0-15	A1	0.1	3.0	36.0	47.9	9.9	96.9	2.7	0.4	22.5	1.42	10.2	7.2	3.1
-2	15-53	A21	0.1	3.2	37.3	47.8	9.8	98.2	1.6	0.2	39.9	1.44	3.2	2.5	1.1
-3	53-114	A22	0.1	3.6	32.6	50.4	11.6	98.3	1.3	0.4	36.8	1.53	3.1	2.0	1.0
-4	114-162	A23	0.1	3.1	27.5	54.5	12.7	97.9	1.8	0.3	21.5	1.70	3.8	2.0	0.8
-5	162-175	B21h	0.1	3.0	17.4	46.6	11.3	78.4	17.5	4.1	10.9	1.46	28.2	25.9	7.5
-6	175-203	B22h	0.3	3.9	19.0	53.1	11.7	88.0	8.7	3.3	0.6	1.65	16.5	12.0	4.7
Kaliga muck:															
(S80FL-049-017)-1	0-64	Oa	---	---	---	---	---	---	---	---	57.2	0.40	142.0	129.7	23.1
-2	64-89	IIC1	0.0	1.4	9.9	41.9	24.4	77.6	14.1	8.3	0.1	1.63	19.4	17.0	6.3
-3	89-152	IIC2	0.0	1.5	9.5	32.0	17.3	60.3	11.4	28.3	0.0	1.49	25.0	22.5	12.8
-4	152-203	IIC3	0.0	2.2	11.9	38.5	15.8	68.4	11.6	20.0	0.0	1.50	23.9	21.9	13.0

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution (mm)								Saturated hydraulic conductivity	Bulk density (field moist)	Water content		
			Sand						Silt	Clay					
			Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.10)	Very fine (0.10-0.05)	Total (2.0-0.05)	(0.05-0.002)	(<0.002)			1/10 bar	1/3 bar	15 bar
	Cm										Cm/hr	G/cm^3	---Percent (wt)--		
Myakka fine sand:															
(S80FL-049-014)-1	0-15	A1	0.0	1.7	21.1	54.5	22.6	99.9	0.0	0.1	27.5	1.15	16.6	11.8	4.6
-2	15-53	A2	0.0	1.8	18.6	56.4	20.4	97.2	2.0	0.8	14.5	1.43	4.8	2.4	0.7
-3	53-64	B21h	0.0	1.4	16.7	49.3	22.3	89.7	5.6	4.7	5.6	1.35	16.9	13.0	4.0
-4	64-76	B22h	0.0	1.6	15.4	51.5	23.0	91.5	4.3	4.2	6.4	1.40	15.6	11.7	3.2
-5	76-102	B3&Bh	0.0	1.5	16.4	55.8	21.2	94.9	3.1	2.0	9.6	1.58	7.7	4.3	1.2
-6	102-117	B3	0.1	1.8	19.2	51.6	22.0	94.7	2.8	2.5	0.2	1.69	15.6	12.7	4.1
-7	117-137	C1	0.7	2.4	16.1	43.0	26.6	88.8	6.8	4.4	3.5	1.56	15.2	9.4	3.2
-8	137-203	C2	0.1	2.1	16.7	54.5	19.3	92.7	4.2	3.1	4.1	1.50	15.6	10.6	3.4
Ona fine sand:															
(S78FL-049-001)-1	0-10	Ap	0.0	0.7	8.7	49.6	28.8	87.8	6.7	5.5	0.4	1.04	52.1	47.6	13.4
-2	10-23	A12	0.0	1.4	18.6	52.5	18.9	91.4	6.5	2.1	5.5	1.50	14.6	10.8	3.5
-3	23-41	Bh	0.0	1.1	13.9	51.2	20.9	87.1	7.8	5.1	12.0	1.26	23.7	19.0	7.5
-4	41-61	C1	0.0	1.1	14.9	56.9	20.2	93.1	4.3	2.6	9.4	1.54	9.3	5.8	2.1
-5	61-107	C2	0.0	1.0	14.3	55.8	23.4	94.5	3.7	1.8	8.5	1.73	7.7	3.8	1.2
-6	107-152	C3	0.0	1.1	13.4	56.3	23.1	93.9	4.0	2.1	4.9	1.84	7.7	2.8	1.3
-7	152-203	C4	0.1	1.2	14.4	53.4	24.1	93.2	5.8	1.0	---	---	---	---	---
Pomello fine sand:															
(S80FL-049-015)-1	0-13	Ap	0.0	1.6	16.8	55.9	23.3	97.7	1.5	0.8	17.4	1.38	9.9	6.0	2.9
-2	13-38	A21	0.0	1.4	14.3	63.5	18.5	97.7	1.9	0.4	---	---	---	---	---
-3	38-117	A22	0.0	1.4	13.3	58.0	25.0	97.7	2.0	0.3	19.3	1.51	4.0	2.3	0.8
-4	117-147	B2h	0.0	1.4	13.8	53.9	20.6	89.7	3.9	6.4	1.3	1.58	19.0	10.8	3.1
-5	147-168	A'2	0.0	1.6	16.8	64.0	15.5	97.9	1.7	0.4	16.5	1.60	4.9	2.2	0.6
-6	168-203	B'h	0.0	1.6	12.2	57.0	22.4	93.2	2.8	4.0	3.3	1.55	14.4	9.1	3.3
Pomona fine sand:															
(S78FL-049-002)-1	0-8	A1	0.0	1.2	18.7	49.9	24.1	93.9	5.5	0.6	21.0	1.32	16.5	12.1	5.2
-2	8-25	A21	0.1	1.6	17.6	50.5	26.3	96.1	3.4	0.5	10.9	1.56	13.5	9.7	1.5
-3	25-68	A22	0.1	1.6	17.6	52.6	25.4	97.3	2.3	0.4	13.8	1.68	4.8	1.9	1.0
-4	68-89	B2h	0.1	1.7	14.6	49.4	27.2	93.0	5.4	1.6	3.2	1.78	9.9	6.2	2.2
-5	89-117	B3	0.2	1.6	14.4	52.3	27.5	96.0	2.9	1.1	4.7	1.77	8.4	4.2	1.0
-6	117-145	A'2	0.1	1.9	15.5	51.5	26.5	95.5	2.9	1.6	2.2	1.75	12.4	7.4	1.6
-7	145-203	B'tg	0.1	1.8	14.8	40.8	22.6	80.1	3.3	16.6	0.2	1.71	21.2	19.6	8.4
Smyrna sand:															
(S79FL-049-012)-1	0-13	A1	0.1	1.9	32.2	47.8	15.1	97.1	2.4	0.5	14.8	1.44	11.4	7.3	3.9
-2	13-41	A2	0.1	2.3	31.3	46.4	16.6	96.7	2.8	0.5	16.3	1.51	5.9	3.0	1.4
-3	41-51	B21h	0.1	2.0	26.9	45.1	16.3	90.4	5.2	1.4	6.2	1.28	24.0	19.2	4.9
-4	51-61	B22h	0.1	1.9	29.1	44.0	15.5	90.6	4.7	4.7	10.7	1.43	14.3	10.3	3.3
-5	61-74	B3&Bh	0.1	2.0	30.0	46.6	16.5	95.2	2.4	2.4	10.8	1.61	8.2	4.6	1.3
-6	74-122	A'2	0.1	2.4	28.3	46.9	18.1	95.8	2.6	1.6	---	---	---	---	---
-7	122-173	B'21h	0.1	1.8	29.1	45.2	17.7	93.9	5.1	1.0	---	---	---	---	---

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution (mm): Sand: Very coarse (2.0-1.0)	Sand: Coarse (1.0-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.10)	Sand: Very fine (0.10-0.05)	Sand: Total (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Saturated hydraulic conductivity	Bulk density (field moist)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm										Cm/hr	G/cm^3	---Percent	(wt)---	
Sparr fine sand:															
(S79FL-049-007)-1	0-15	Ap	0.1	1.6	14.2	54.7	26.3	96.9	0.9	2.2	12.7	1.49	7.6	4.1	1.7
-2	15-41	A21	0.0	1.5	13.1	52.4	26.7	93.7	3.1	3.2	10.0	1.56	9.5	5.9	2.0
-3	41-74	A22	0.0	1.2	11.9	53.4	27.4	93.9	2.8	3.3	13.1	1.56	7.6	4.3	1.6
-4	74-109	A23	0.0	1.4	11.3	55.1	27.0	94.8	2.2	3.0	15.9	1.52	7.5	4.1	1.6
-5	109-135	A24	0.0	1.8	13.8	53.4	26.8	95.8	1.9	2.3	11.9	1.55	8.2	3.8	1.0
-6	135-152	A3	0.0	1.8	11.8	50.3	29.6	93.5	2.6	3.9	7.2	1.59	9.7	4.1	1.3
-7	152-170	B21tg	0.0	1.3	10.5	44.7	24.1	80.6	2.2	17.2	0.2	1.67	18.0	13.9	6.7
-8	170-203	B22tg	0.0	1.0	7.8	33.6	21.0	63.4	5.6	31.0	0.0	1.61	22.3	20.5	13.4
Tavares fine sand:															
(S80FL-049-018)-1	0-13	Ap	1.8	3.5	22.5	54.2	8.3	90.3	8.4	1.3	13.4	1.52	7.5	4.5	1.9
-2	13-61	C1	0.1	2.3	20.0	53.2	20.9	96.5	1.9	1.6	19.7	1.52	5.3	2.8	0.8
-3	61-127	C2	0.0	2.4	20.9	54.8	18.8	96.9	1.7	1.4	31.5	1.48	5.0	2.9	0.7
-4	127-175	C3	0.1	2.4	18.4	54.3	22.3	97.5	1.4	1.1	29.6	1.53	5.1	2.5	0.5
-5	175-203	C4	0.0	2.4	21.2	54.5	19.3	97.4	1.5	1.1	26.9	1.53	4.5	2.3	0.5
Wauchula fine sand:															
(S79FL-049-010)-1	0-15	Ap	0.0	1.2	24.7	51.9	17.9	95.7	3.4	0.9	12.8	1.26	18.7	13.5	4.3
-2	15-36	A21	0.1	2.1	17.5	54.0	22.8	96.5	3.2	0.3	12.4	1.53	6.7	3.6	2.0
-3	36-56	A22	0.0	2.2	18.1	54.0	22.5	96.8	3.2	0.0	20.0	1.53	6.4	3.4	1.6
-4	56-74	B21h	0.1	2.5	15.2	50.6	22.9	91.3	4.4	4.3	1.6	1.54	18.5	14.5	3.9
-5	74-86	B22h	0.1	2.5	15.6	52.4	22.7	93.3	6.0	0.7	4.5	1.50	14.7	10.8	3.4
-6	86-96	B3	0.1	2.9	15.8	52.4	23.6	94.8	3.6	1.6	8.5	1.63	12.5	6.8	1.4
-7	96-127	B'2tg	0.0	1.4	12.5	40.4	17.4	71.7	7.5	20.8	1.2	1.59	22.6	21.0	10.7
-8	127-203	B'3g	0.0	0.9	10.8	51.2	20.7	83.6	4.6	11.8	0.1	1.76	17.2	15.1	6.3
Zolfo fine sand:															
(S78FL-049-005)-1	0-18	Ap	0.0	0.6	6.1	62.5	24.9	94.1	2.5	3.4	4.1	1.52	12.7	6.8	3.0
-2	18-41	A21	0.0	0.7	6.5	58.8	29.3	95.3	3.3	1.4	9.4	1.52	8.8	4.1	1.1
-3	41-71	A22	0.0	0.5	6.2	59.8	29.2	95.7	3.0	1.3	11.3	1.54	7.4	3.3	0.9
-4	71-114	A23	0.0	0.6	6.5	61.3	27.8	96.2	2.5	1.3	12.2	1.54	7.7	3.1	0.8
-5	114-160	A24	0.0	0.6	7.2	60.9	27.8	96.5	2.7	0.8	10.9	1.61	8.5	3.0	0.5
-6	160-173	B21h	0.0	0.5	6.7	61.8	27.2	96.2	2.6	1.2	6.8	1.70	12.4	4.7	0.9
-7	173-203	B22h	0.0	0.6	6.5	60.6	27.4	95.1	3.8	1.1	5.7	1.62	14.5	6.3	1.4

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Mg	Na	K	Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH: 1/	2/	3/	Pyrophosphate extractable: C	Fe	Al	Citrate dithionite extractable: Al	Fe
	Cm		----Milliequivalents/100 grams of soil-----							-Percent-		Mmho /cm				----------Percent----------				
Apopka fine sand:[4]																				
S79FL-049-006-1	0-20	Ap	3.45	1.48	0.03	0.19	5.15	3.13	8.28	62	1.18	0.23	6.5	5.9	6.1	---	---	---	---	---
-2	20-51	A21	0.20	0.10	0.01	0.02	0.33	1.49	1.82	18	0.34	0.04	5.1	5.0	4.4	---	---	---	---	---
-3	51-81	A22	0.06	0.07	0.00	0.02	0.15	0.89	1.04	14	0.25	0.04	5.2	4.8	4.4	---	---	---	---	---
-4	81-140	A23	0.04	0.06	0.00	0.01	0.11	0.00	0.11	100	0.06	0.03	5.4	5.0	4.6	---	---	---	---	---
-5	140-165	B1t	0.34	2.12	0.02	0.12	2.60	1.38	3.98	65	0.10	0.08	5.4	5.2	5.1	---	---	---	---	---
-6	165-178	B21t	1.51	1.23	0.04	0.38	3.16	4.28	7.44	42	0.15	0.11	5.4	5.1	4.8	---	---	---	0.34	2.15
-7	178-203	B22t	1.70	1.26	0.05	0.37	3.38	5.29	8.67	39	0.18	0.10	5.0	4.5	4.2	---	---	---	0.49	4.40
Bradenton loamy fine sand:																				
S80FL-049-016-1	0-10	A1	5.30	1.93	0.11	0.10	7.44	7.52	14.96	50	3.11	0.06	5.7	5.1	4.8	---	---	---	---	---
-2	10-20	A21	1.09	0.36	0.05	0.02	1.52	2.81	4.33	35	0.88	0.02	5.7	4.7	4.5	---	---	---	---	---
-3	20-33	A22	0.32	0.17	0.03	0.01	0.53	0.59	1.12	47	0.49	0.02	5.6	4.7	4.5	---	---	---	---	---
-4	33-51	B21tg	7.50	7.41	0.13	0.03	15.07	6.54	21.61	70	0.66	0.03	5.8	4.9	4.3	---	---	---	0.17	0.04
-5	51-68	B22tgca	7.50	7.41	0.11	0.03	15.05	4.64	19.69	76	0.30	0.02	6.2	5.6	4.8	---	---	---	0.06	0.02
-6	68-91	C1ca	9.00	6.58	0.10	0.02	15.70	2.32	18.02	87	0.23	0.11	8.6	7.6	7.6	---	---	---	---	---
-7	91-142	C2ca	11.33	10.29	0.23	0.02	21.87	3.92	25.79	85	0.20	0.13	8.6	7.7	7.8	---	---	---	---	---
-8	142-193	C3ca	9.83	9.05	0.25	0.01	19.14	4.24	23.38	82	0.21	0.11	8.6	7.9	7.8	---	---	---	---	---
-9	193-203	C4ca	3.35	5.35	0.16	0.01	8.87	3.33	12.20	73	0.20	0.14	8.2	7.6	7.3	---	---	---	---	---
Cassia fine sand:																				
S78FL-049-004-1	0-15	A1	1.05	0.16	0.01	0.02	1.24	5.55	6.79	18	1.15	0.02	4.8	3.7	3.4	---	---	---	---	---
-2	15-68	A2	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0	0.05	0.01	5.3	4.5	4.1	---	---	---	---	---
-3	68-86	B21h	0.00	0.00	0.01	0.01	0.02	15.72	15.74	0	1.11	0.02	4.9	4.1	3.9	0.80	0.01	0.38	0.23	0.02
-4	86-107	B22h	0.03	0.00	0.01	0.01	0.05	11.09	11.14	0	0.69	0.02	5.0	4.3	4.1	---	---	---	---	---
-5	107-145	B31	0.00	0.04	0.01	0.00	0.05	4.79	4.84	1	0.32	0.02	5.0	4.4	4.3	---	---	---	---	---
-6	145-165	B32&B'h	0.00	0.04	0.01	0.01	0.06	7.19	7.25	1	0.43	0.02	5.1	4.7	4.3	0.24	0.04	0.28	0.19	0.06
-7	165-203	C	0.00	0.00	0.01	0.00	0.01	1.78	1.79	1	0.18	0.02	4.8	4.8	4.6	---	---	---	---	---
Electra sand:																				
S79FL-049-009-1	0-10	Ap	1.32	0.51	0.14	0.12	2.09	1.57	3.66	57	1.08	0.08	6.3	5.0	5.0	---	---	---	---	---
-2	10-41	A21	0.64	0.08	0.10	0.03	0.85	0.24	1.09	78	0.25	0.03	6.7	4.9	5.1	---	---	---	---	---
-3	41-107	A22	0.13	0.02	0.02	0.00	0.17	0.00	0.17	100	0.05	0.02	6.7	5.0	5.4	---	---	---	---	---
-4	107-114	B21h	1.20	0.14	0.05	0.02	1.41	12.64	14.05	10	0.76	0.04	6.0	5.2	4.7	1.16	0.04	0.30	0.22	0.07
-5	114-137	B22h	1.34	0.11	0.03	0.02	1.50	9.75	11.25	13	0.73	0.03	6.0	5.2	4.7	0.63	0.02	0.28	0.20	0.05
-6	137-152	B23h	0.54	0.06	0.03	0.02	0.65	6.77	7.42	9	0.36	0.03	6.0	5.0	4.5	0.30	0.02	0.02	0.13	0.03
-7	152-168	B3&Bh	0.31	0.04	0.02	0.03	0.40	5.14	5.54	7	0.28	0.04	5.9	4.9	4.5	0.18	0.03	0.13	0.13	0.14
-8	168-183	B'21tg	0.78	0.27	0.05	0.23	1.33	8.85	10.18	13	0.31	0.04	5.4	4.2	4.1	---	---	---	0.29	1.58
-9	183-203	B'22tg	0.78	2.34	0.07	0.20	3.39	7.39	10.78	31	0.10	0.03	5.3	4.0	3.7	---	---	---	0.12	0.63

See footnotes at end of table.

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH 1/	pH 2/	pH 3/	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate dithionite extractable: Al	Citrate dithionite extractable: Fe
	Cm		Milliequivalents/100 grams of soil							Percent		Mmho /cm				Percent				
Farmton fine sand:																				
S80FL-049-013-1	0-15	Ap	6.40	0.40	0.10	0.08	6.98	9.74	16.72	42	3.85	0.06	5.1	4.2	4.2	---	---	---	---	---
-2	15-30	A21	0.35	0.03	0.04	0.00	0.42	0.06	0.48	88	0.22	0.03	5.2	4.2	4.3	---	---	---	---	---
-3	30-48	A22	0.17	0.02	0.04	0.00	0.23	0.33	0.56	41	0.09	0.03	5.3	4.5	4.6	---	---	---	---	---
-4	48-86	A23	0.12	0.02	0.03	0.00	0.17	0.39	0.56	30	0.03	0.02	5.7	5.1	5.1	---	---	---	---	---
-5	86-114	B21h	0.86	0.04	0.08	0.00	0.98	5.32	6.30	16	0.65	0.03	5.0	4.0	3.8	0.55	0.02	0.05	0.04	0.03
-6	114-140	B3	0.13	0.03	0.07	0.01	0.24	3.42	3.66	7	0.33	0.06	4.9	4.2	4.2	0.26	0.04	0.06	0.06	0.10
-7	140-155	B'h	0.21	0.09	0.05	0.01	0.36	9.26	9.62	4	0.95	0.04	5.0	4.2	4.2	0.91	0.03	0.15	0.11	0.05
-8	155-180	B'21tg	0.57	0.74	0.14	0.02	1.47	7.00	8.47	17	0.21	0.05	4.9	4.0	3.7	---	---	---	0.09	0.34
-9	180-203	B'22tg	0.90	1.15	0.15	0.01	2.21	7.98	10.19	22	0.29	0.03	4.4	3.4	3.0	---	---	---	0.04	0.35
Felda fine sand:																				
S79FL-049-011-1	0-10	Ap	0.26	0.11	0.03	0.04	0.44	4.35	4.79	9	1.56	0.06	4.8	3.8	3.8	---	---	---	---	---
-2	10-28	A21	0.01	0.01	0.01	0.00	0.03	0.60	0.63	5	0.51	0.02	4.9	4.3	4.1	---	---	---	---	---
-3	28-53	A22	0.04	0.01	0.01	0.00	0.06	0.27	0.33	18	0.06	0.02	5.6	4.9	4.6	---	---	---	---	---
-4	53-79	A23	0.27	0.09	0.02	0.00	0.38	0.24	0.62	61	0.04	0.03	6.1	5.7	5.5	---	---	---	---	---
-5	79-112	B21t	3.06	3.06	0.26	0.02	6.40	2.88	9.28	69	0.11	0.21	6.9	6.6	6.2	---	---	---	0.02	0.11
-6	112-147	B22tg	2.97	34.98	0.13	0.07	38.15	3.49	41.64	92	0.12	0.07	6.3	6.2	5.4	---	---	---	0.02	0.31
-7	147-203	Cg	5.77	1.65	0.16	0.02	7.60	1.71	9.31	82	0.07	0.09	6.5	6.3	5.9	---	---	---	0.01	0.13
Ft. Green fine sand:																				
S79FL-049-008-1	0-15	Ap	3.76	0.51	0.12	0.11	4.50	7.21	11.71	38	3.04	0.11	5.9	5.5	5.2	---	---	---	---	---
-2	15-43	A21	1.05	0.09	0.04	0.02	1.20	4.47	5.67	21	0.59	0.04	5.7	4.9	4.5	---	---	---	---	---
-3	43-79	A22	0.63	0.07	0.04	0.01	0.75	3.12	3.87	19	0.24	0.07	5.4	4.8	4.4	---	---	---	---	---
-4	79-107	B21tg	3.82	0.76	0.10	0.02	4.70	4.96	9.66	49	0.05	0.10	5.4	4.9	4.5	---	---	---	0.05	0.31
-5	107-132	B22tb	4.26	0.90	0.11	0.03	5.30	3.47	8.77	60	0.04	0.08	5.6	5.1	4.7	---	---	---	0.04	0.07
-6	132-203	B23tg	2.45	1.03	0.15	0.05	3.68	5.37	9.05	41	0.05	0.08	5.5	5.2	4.9	---	---	---	0.07	0.08
Jonathan sand:																				
S78FL-049-003-1	0-15	A1	0.65	0.33	0.03	0.17	1.18	5.15	6.33	19	0.95	0.05	5.2	3.7	3.4	---	---	---	---	---
-2	15-53	A21	0.00	0.00	0.01	0.01	0.02	1.03	1.05	2	0.12	0.01	5.7	4.0	3.6	---	---	---	---	---
-3	53-114	A22	0.00	0.00	0.01	0.01	0.02	0.55	0.57	4	0.05	0.01	5.6	4.4	4.0	---	---	---	---	---
-4	114-162	A23	0.00	0.00	0.01	0.00	0.01	1.16	1.17	1	0.04	0.01	5.5	4.8	4.4	---	---	---	---	---
-5	162-175	B21h	0.00	0.04	0.03	0.01	0.08	15.82	15.90	1	2.37	0.06	4.1	3.5	3.5	1.40	0.02	0.35	0.17	0.02
-6	175-203	B22h	0.00	0.08	0.02	0.01	0.11	41.09	41.20	0	3.67	0.10	4.0	3.4	3.3	3.01	0.01	0.48	0.39	0.03
Kaliga muck:																				
S80FL-049-017-1	0-64	Oa	5.00	12.34	0.27	0.16	17.77	106.96	124.73	14	30.12	0.06	3.8	3.4	3.1	---	---	---	---	---
-2	64-89	IIC1	0.43	1.15	0.08	0.01	1.67	5.56	7.23	23	1.10	0.38	5.2	4.4	4.5	---	---	---	---	---
-3	89-152	IIC2	1.20	5.35	0.39	0.17	7.11	8.51	15.62	46	1.40	0.21	6.9	4.4	5.7	---	---	---	---	---
-4	152-203	IIC3	1.00	3.66	0.34	0.09	5.09	5.45	10.54	48	1.15	0.27	7.1	6.9	6.4	---	---	---	---	---

See footnotes at end of table.

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Mg	Na	K	Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH 1/	pH 2/	pH 3/	Pyrophosphate extractable: C	Fe	Al	Citrate dithionite extractable: Al	Fe
	Cm		----Milliequivalents/100 grams of soil-----							-Percent-		Mmho /cm				---------Percent---------				
Myakka fine sand:																				
S80FL-049-014-1	0-15	A1	0.94	0.37	0.05	0.03	1.39	9.67	11.06	13	4.39	0.04	4.4	3.4	3.1	---	---	---	---	---
-2	15-53	A2	0.12	0.05	0.02	0.01	0.20	1.18	1.38	14	0.57	0.02	5.1	3.9	3.6	---	---	---	---	---
-3	53-64	B21h	0.29	0.10	0.06	0.02	0.47	12.91	13.38	4	2.65	0.04	4.6	3.7	3.6	1.25	0.01	0.19	0.10	0.03
-4	64-76	B22h	0.09	0.04	0.06	0.01	0.20	17.84	18.04	1	1.61	0.03	4.7	3.9	3.9	1.34	0.01	0.29	0.18	0.02
-5	76-102	B3&Bh	0.04	0.02	0.05	0.00	0.11	5.58	5.69	2	0.53	0.03	4.8	4.3	4.1	0.24	0.00	0.13	0.08	0.03
-6	102-117	B3	0.07	0.11	0.06	0.00	0.24	9.00	9.24	3	0.42	0.04	5.0	4.4	4.2	---	---	---	---	---
-7	117-137	C1	0.05	0.16	0.09	0.00	0.30	12.94	13.24	2	0.40	0.06	5.0	4.5	4.4	---	---	---	---	---
-8	137-203	C2	0.06	0.12	0.11	0.00	0.29	12.34	12.63	2	0.45	0.06	5.1	4.6	4.5	---	---	---	---	---
Ona fine sand:																				
S78FL-049-001-1	0-10	Ap	14.18	2.84	0.07	1.01	18.10	14.85	32.95	55	7.77	0.48	5.7	5.3	5.0	---	---	---	---	---
-2	10-23	A12	4.95	0.82	0.03	0.40	6.20	8.25	14.45	43	2.04	0.16	5.5	4.7	4.6	---	---	---	---	---
-3	23-41	Bh	3.28	0.78	0.01	0.69	4.76	31.34	36.10	13	2.88	0.15	5.2	4.5	3.9	2.16	0.03	0.78	0.54	0.05
-4	41-61	C1	0.48	0.12	0.03	0.16	0.79	4.81	5.60	14	0.40	0.10	5.9	5.0	4.7	---	---	---	---	---
-5	61-107	C2	0.20	0.08	0.00	0.12	0.40	1.81	2.21	18	0.12	0.09	6.1	5.4	5.1	---	---	---	---	---
-6	107-152	C3	0.10	0.08	0.01	0.18	0.37	2.06	2.43	15	0.09	0.11	6.3	5.5	5.1	---	---	---	---	---
-7	152-203	C4	0.20	0.08	0.02	0.14	0.44	4.70	5.14	8	0.16	0.22	5.9	5.4	5.4	---	---	---	---	---
Pomello fine sand:																				
S80FL-049-015-1	0-13	Ap	0.83	0.24	0.06	0.02	1.15	3.55	4.70	24	1.44	0.03	5.0	3.8	3.7	---	---	---	---	---
-2	13-38	A21	0.27	0.04	0.03	0.01	0.35	0.20	0.55	64	0.59	0.02	5.3	3.9	3.9	---	---	---	---	---
-3	38-117	A22	0.04	0.01	0.02	0.00	0.07	0.06	0.13	54	0.22	0.01	5.8	4.7	4.5	---	---	---	---	---
-4	117-147	B2h	0.41	0.06	0.03	0.01	0.51	23.05	23.56	2	3.05	0.03	4.5	3.8	3.5	2.21	0.00	0.24	0.19	0.01
-5	147-168	A'2	0.13	0.01	0.03	0.00	0.17	0.26	0.43	40	0.44	0.02	5.0	4.3	4.1	---	---	---	---	---
-6	168-203	B'h	0.53	0.09	0.02	0.00	0.64	17.56	18.20	4	2.68	0.03	4.3	3.4	3.2	1.97	0.00	0.11	0.09	0.01
Pomona fine sand:																				
S78FL-049-002-1	0-8	A1	0.75	0.29	0.03	0.04	1.11	7.01	8.12	14	1.02	0.07	4.3	3.3	3.0	---	---	---	---	---
-2	8-25	A21	0.10	0.04	0.02	0.01	0.17	1.24	1.41	12	0.27	0.03	4.9	3.5	3.3	---	---	---	---	---
-3	25-68	A22	0.00	0.04	0.00	0.00	0.04	0.00	0.04	100	0.11	0.02	4.9	4.3	3.9	---	---	---	---	---
-4	68-89	B2h	0.00	0.00	0.00	0.00	0.00	5.26	5.26	0	0.62	0.02	4.5	3.7	3.6	0.38	0.04	0.15	0.04	0.05
-5	89-117	B3	0.00	0.00	0.00	0.00	0.00	2.34	2.34	0	0.35	0.02	4.7	4.1	4.0	---	---	---	---	---
-6	117-145	A'2	0.03	0.08	0.01	0.00	0.12	2.34	2.46	5	0.28	0.02	5.0	4.4	4.2	---	---	---	---	---
-7	145-203	B'tg	0.68	1.32	0.10	0.00	2.10	8.87	10.97	19	0.13	0.02	5.0	3.8	3.3	---	---	---	0.08	0.25
Smyrna sand:																				
S79FL-049-012-1	0-13	A1	0.58	0.26	0.09	0.02	0.95	7.39	8.34	11	1.65	0.06	4.3	3.3	3.1	---	---	---	---	---
-2	13-41	A2	0.04	0.02	0.02	0.00	0.08	0.81	0.89	9	0.20	0.02	4.9	3.7	3.6	---	---	---	---	---
-3	41-51	B21h	0.08	0.05	0.07	0.01	0.21	19.17	19.38	1	2.24	0.05	4.3	3.7	3.5	1.58	0.02	0.24	0.17	0.05
-4	51-61	B22h	0.03	0.02	0.04	0.00	0.09	20.97	21.06	--	1.91	0.04	4.6	4.0	3.8	1.24	0.01	0.36	0.26	0.01
-5	61-74	B3&Bh	0.02	0.01	0.01	0.00	0.04	5.29	5.33	1	0.39	0.04	4.7	4.4	4.2	0.22	0.01	0.14	0.10	0.06
-6	74-122	A'2	0.01	0.01	0.01	0.00	0.03	1.86	1.89	2	0.08	0.03	4.7	4.7	4.6	---	---	---	---	---
-7	122-173	B'21h	0.01	0.01	0.02	0.00	0.04	6.39	6.43	1	0.30	0.03	4.8	4.9	4.7	0.12	0.02	0.14	0.09	0.07

See footnotes at end of table.

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH: 1/	pH: 2/	pH: 3/	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate dithionite extractable: Al	Citrate dithionite extractable: Fe
	Cm		----Milliequivalents/100 grams of soil-----							-Percent-		Mmho /cm				---------Percent---------				
Sparr fine sand:																				
S79FL-049-007-1	0-15	Ap	0.93	0.74	0.02	0.17	1.86	0.73	2.59	72	0.75	0.12	7.0	6.2	6.8	---	---	---	---	---
-2	15-41	A21	0.21	0.10	0.01	0.06	0.38	2.25	2.63	14	0.36	0.03	6.1	5.2	4.6	---	---	---	---	---
-3	41-74	A22	0.03	0.03	0.01	0.03	0.10	1.57	1.67	6	0.15	0.04	5.4	4.3	4.3	---	---	---	---	---
-4	74-109	A23	0.03	0.03	0.02	0.02	0.10	0.68	0.78	13	0.17	0.04	4.6	4.2	4.3	---	---	---	---	---
-5	109-135	A24	1.24	0.74	0.07	0.19	2.24	0.14	2.38	94	0.12	0.06	4.7	4.2	4.3	---	---	---	---	---
-6	135-152	A3	0.04	0.04	0.00	0.01	0.09	0.81	0.90	10	0.09	0.05	4.7	4.1	4.2	---	---	---	---	---
-7	152-170	B21tg	0.55	0.37	0.03	0.08	1.03	3.17	4.20	25	0.17	0.07	4.9	4.1	4.0	---	---	---	0.13	0.56
-8	170-203	B22tg	1.34	0.79	0.07	0.19	2.39	6.01	8.40	28	0.19	0.10	4.8	4.1	3.8	---	---	---	0.24	1.34
Tavares fine sand:																				
S80FL-049-018-1	0-13	Ap	0.18	0.86	0.02	0.07	1.13	2.16	3.29	34	0.99	0.06	6.4	6.0	6.1	---	---	---	---	---
-2	13-61	C1	0.25	0.17	0.02	0.03	0.47	3.14	3.61	13	0.64	0.04	5.8	4.8	4.3	---	---	---	---	---
-3	61-127	C2	0.07	0.09	0.01	0.01	0.18	1.44	1.62	11	0.24	0.02	5.6	4.9	4.6	---	---	---	---	---
-4	127-175	C3	0.04	0.04	0.01	0.01	0.10	2.84	2.94	3	0.21	0.01	6.5	5.2	4.7	---	---	---	---	---
-5	175-203	C4	0.05	0.05	0.01	0.01	0.12	1.24	1.36	9	0.21	0.02	5.5	4.8	4.7	---	---	---	---	---
Wauchula fine sand:																				
S79FL-049-010-1	0-15	Ap	2.55	0.06	0.06	0.04	2.71	6.58	9.29	29	2.53	0.09	4.6	3.9	4.0	---	---	---	---	---
-2	15-36	A21	0.11	0.01	0.00	0.00	0.12	0.60	0.72	17	0.18	0.03	4.9	4.2	4.1	---	---	---	---	---
-3	36-56	A22	0.08	0.01	0.00	0.00	0.09	0.27	0.36	25	0.09	0.02	5.4	4.8	4.9	---	---	---	---	---
-4	56-74	B21h	0.59	0.11	0.01	0.00	0.71	10.23	10.94	6	1.56	0.03	4.7	4.0	3.7	0.71	0.02	0.14	0.08	0.02
-5	74-86	B22h	0.16	0.06	0.11	0.00	0.33	11.17	11.50	3	0.99	0.06	5.2	4.2	3.8	0.79	0.01	0.19	0.13	0.06
-6	86-96	B3	0.05	0.04	0.02	0.00	0.11	4.25	4.36	3	0.33	0.05	5.0	4.3	4.1	---	---	---	---	---
-7	96-127	B'2tg	1.43	1.36	0.16	0.06	3.01	16.85	19.86	15	0.38	0.06	4.7	4.0	3.9	---	---	---	0.20	0.50
-8	127-203	B'3g	1.45	1.07	0.11	0.04	2.67	9.75	12.42	21	0.15	0.04	5.1	4.1	4.0	---	---	---	0.09	0.15
Zolfo fine sand:																				
S78FL-049-005-1	0-18	Ap	5.05	0.82	0.02	0.12	6.01	4.86	10.87	55	1.14	0.13	6.8	6.7	6.5	---	---	---	---	---
-2	18-41	A21	1.63	0.41	0.02	0.09	2.15	5.82	7.97	27	0.41	0.04	6.8	6.3	6.0	---	---	---	---	---
-3	41-71	A22	0.38	0.16	0.01	0.03	0.58	3.29	3.87	15	0.17	0.04	6.6	6.1	5.8	---	---	---	---	---
-4	71-114	A23	0.28	0.16	0.01	0.03	1.79	2.19	3.98	45	0.10	0.03	6.6	6.2	5.9	---	---	---	---	---
-5	114-160	A24	0.18	0.08	0.02	0.05	0.33	1.44	1.77	19	0.05	0.04	6.7	6.4	5.9	---	---	---	---	---
-6	160-173	B21h	0.38	0.16	0.01	0.03	0.58	2.60	3.18	18	0.19	0.04	6.4	6.0	5.6	0.04	0.01	0.10	0.08	0.03
-7	173-203	B22h	0.40	0.16	0.03	0.03	0.62	4.73	5.35	12	0.35	0.04	6.4	5.8	5.3	0.22	0.02	0.15	0.10	0.03

[1] H_2O (1:1).

[2] 0.01<u>M</u> $CaCl_2$ (1:2).

[3] 1<u>N</u> KCl (1:1).

[4] This pedon is considered to be a taxadjunct to the Apopka series because the B22t horizon has a base saturation that is slightly higher than 35 percent.

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS

Soil series and sample numbers	Depth	Horizon	Percentage of clay minerals			
			Montmorillonite	14-Angstrom intergrade	Kaolinite	Quartz
	Cm		Pct	Pct	Pct	Pct
Apopka fine sand:						
(S79FL-049-006)-1	0-20	Ap	0	53	47	0
-3	51-81	A22	0	59	32	9
-6	165-178	B21t	0	42	58	0
Bradenton loamy fine sand:						
(S80FL-049-016)-1	0-10	A1	95	0	3	2
-4	33-51	B21tg	95	0	3	2
-7	91-142	C2ca	95	0	2	3
-9	193-203	C4ca	95	0	1	4
Cassia fine sand:						
(S78FL-049-004)-1	0-15	A1	21	7	9	63
-3	68-86	B21h	8	4	5	83
-7	165-203	C	0	2	2	96
Electra sand:						
(S79FL-049-009)-1	0-10	Ap	0	0	42	58
-4	107-114	B21h	0	37	13	50
-8	168-183	B'21tg	0	43	57	0
-9	183-203	B'22tg	0	36	64	0
Farmton fine sand:						
(S80FL-049-013)-1	0-15	Ap	0	0	0	100
-5	86-114	B21h	39	0	7	54
-8	155-180	B'21tg	27	17	33	28
Felda fine sand:						
(S79FL-049-011)-1	0-10	Ap	0	38	0	62
-5	79-112	B21t	97	0	0	3
-6	112-147	B22tg	97	0	1	2
Ft. Green fine sand:						
(S79FL-049-008)-1	0-15	Ap	0	43	29	28
-4	79-107	B21tg	55	9	33	3
-5	107-132	B22tg	61	11	25	3
Jonathan sand:						
(S78FL-049-003)-1	0-15	A1	0	6	10	84
-5	162-175	B21h	0	6	2	92
-6	175-203	B22h	0	0	0	100
Kaliga muck:						
(S80FL-049-017)-1	64-89	IIC1	80	0	6	14
-4	152-203	IIC3	80	0	3	17
Myakka fine sand:						
(S80FL-049-014)-1	0-15	A1	0	0	0	100
-3	53-64	B21h	0	9	6	85
-8	137-203	C2	0	0	14	86
Ona fine sand:						
(S78FL-049-001)-1	0-10	Ap	0	10	11	79
-3	23-41	Bh	0	0	0	100
-5	61-107	C2	0	12	7	81
-7	152-203	C4	0	6	7	87
Pomello fine sand:						
(S80FL-049-015)-1	0-13	Ap	0	0	14	86
-4	117-147	B2h	7	0	0	93
-6	168-203	B'h	0	0	0	100
Pomona fine sand:						
(S78FL-049-002)-1	0-8	A1	0	0	0	100
-4	68-89	B2h	8	7	5	80
-7	145-203	B'tg	92	0	7	1

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Percentage of clay minerals: Montmorillonite	14-Angstrom intergrade	Kaolinite	Quartz
	Cm		Pct	Pct	Pct	Pct
Smyrna sand:						
(S79FL-049-012)-1	0-13	A1	0	0	0	100
-3	41-51	B21h	0	0	0	100
-7	122-173	B'21h	0	16	0	84
Sparr fine sand:						
(S79FL-049-007)-1	0-15	Ap	0	50	36	14
-4	74-109	A23	0	53	29	18
-7	152-170	B21tg	0	31	38	31
Tavares fine sand:						
(S80FL-049-018)-1	0-13	Ap	0	39	27	34
-3	61-127	C2	0	49	24	27
-5	175-203	C4	0	57	28	15
Wauchula fine sand:						
(S79FL-049-010)-1	0-15	Ap	0	0	0	100
-4	56-74	B21h	20	0	0	80
-7	96-127	B'2tg	98	0	0	2
-8	127-203	B'3g	98	0	0	2
Zolfo fine sand:						
(S78FL-049-005)-1	0-18	Ap	14	27	12	47
-4	71-114	A23	10	31	15	44
-6	160-173	B21h	3	5	5	87
-7	173-203	B22h	TR	11	5	84

TABLE 21.--ENGINEERING INDEX TEST DATA

[Tests performed by the Florida Department of Transportation (FDOT) in cooperation with the U.S. Department of Transportation, Federal Highway Administration, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO). See the section "Soil Series and Their Morphology" for location of pedon sampled. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	Classification		Mechanical analysis[1] Percentage smaller than--			Percentage smaller than--				Liquid limit	Plasticity index	Moisture[2] density	
	AASHTO[3]	Unified (estimated)	No. 10	No. 40	No. 200	0.05 mm	0.02 mm	0.005 mm	0.002 mm			Max. dry density	Optimum moisture
										Pct		Lb/ft3	Pct
Bradenton loamy fine sand: (S80FL-049-016) FDOT 16, 17, 18													
A22----------------8-13	A-2-4(0)	SM	100	94	14	6	0	0	0	-	NP	107	14
B21tg--------------13-20	A-2-4(0)	SM	100	95	29	23	22	16	15	-	NP	110	14
C1ca---------------26-36	A-2-4(0)	SC	100	95	30	24	19	16	15	28	10	114	13
Farmton fine sand: (S80FL-049-013) FDOT 9, 10, 11													
A23----------------19-34	A-2-4(0)	SM	100	98	16	8	2	0	0	-	NP	102	15
B21h---------------34-45	A-2-4(0)	SM	100	98	18	8	0	0	0	-	NP	104	14
B'21tg-------------61-71	A-2-4(0)	SM	100	98	30	23	16	15	14	-	NP	119	10
Felda fine sand: (S79FL-049-011) FDOT 5, 6													
A22----------------11-21	A-3(0)	SP-SM	100	91	6	0	0	0	0	-	NP	108	11
B21t---------------31-44	A-2-4(0)	SM	100	92	16	13	8	6	6	-	NP	119	12
Myakka fine sand: (S80FL-049-014) FDOT 12, 13													
A2------------------6-21	A-3(0)	SP-SM	100	97	10	5	2	0	0	-	NP	102	14
B21h---------------21-25	A-2-4(0)	SM	100	97	18	9	2	0	0	-	NP	103	14
Pomello fine sand: (S80FL-049-015) FDOT 14, 15													
A22----------------15-46	A-3(0)	SP-SM	100	97	8	4	0	0	0	-	NP	101	16
B2h----------------46-58	A-2-4(0)	SM	100	97	14	8	3	1	0	-	NP	104	14
Smyrna sand: (S79-FL-049-012) FDOT 7, 8													
A2------------------5-16	A-2-4(0)	SP-SM	100	96	12	8	2	0	0	-	NP	105	13
B21h---------------16-20	A-2-4(0)	SM	100	94	14	7	0	0	0	-	NP	102	16
Sparr fine sand: (S79FL-049-007) FDOT 1, 2													
A22----------------16-29	A-2-4(0)	SM	100	95	14	9	3	2	2	-	NP	110	12
B21tg--------------60-67	A-2-4(0)	SC	100	97	33	28	23	20	20	23	7	113	14

See footnotes at end of table.

TABLE 21.--ENGINEERING INDEX TEST DATA

Soil name, report number, horizon, and depth in inches	Classification		Mechanical analysis[1]							Liquid limit	Plasticity index	Moisture[2] density	
			Percentage smaller than--			Percentage smaller than--							
	AASHTO[3]	Unified (estimated)	No. 10	No. 40	No. 200	0.05 mm	0.02 mm	0.005 mm	0.002 mm			Max. dry density	Optimum moisture
										Pct		Lb/ft3	Pct
Tavares fine sand:													
(S80FL-049-018)													
FDOT 19, 20													
C1-------------------5-24	A-3(0)	SP-SM	100	96	10	4	1	0	0	-	NP	108	13
C3------------------50-69	A-3(0)	SP-SM	100	95	8	5	2	0	0	-	NP	105	14
Wauchula fine sand:													
(S79FL-049-010)													
FDOT 3, 4													
B21h----------------22-29	A-2-4(0)	SM	100	95	15	0	0	0	0	-	NP	103	14
B'2tg---------------38-50	A-2-4(0)	SM-SC	100	97	31	25	20	18	17	23	5	111	15

[1]Mechanical analyses according to AASHTO designation T88-78. Results by this procedure differ somewhat from those obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-sized fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from the calculations of grain-sized fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

[2]Based on AASHTO Designation T99-74.

[3]Based on AASHTO Designation M145-73.

TABLE 22.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adamsville	Hyperthermic, uncoated Aquic Quartzipsamments
Apopka	Loamy, siliceous, hyperthermic Grossarenic Paleudults
Basinger	Siliceous, hyperthermic Spodic Psammaquents
Bradenton	Coarse-loamy, siliceous, hyperthermic Typic Ochraqualfs
Candler	Hyperthermic, uncoated Typic Quartzipsamments
Cassia	Sandy, siliceous, hyperthermic Typic Haplohumods
Chobee	Fine-loamy, siliceous, hyperthermic Typic Argiaquolls
Electra	Sandy, siliceous, hyperthermic Arenic Ultic Haplohumods
Farmton	Sandy, siliceous, hyperthermic Arenic Ultic Haplaquods
Felda	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Floridana	Loamy, siliceous, hyperthermic Arenic Argiaquolls
Ft. Green	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Holopaw	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Hontoon	Dysic, hyperthermic Typic Medisaprists
Immokalee	Sandy, siliceous, hyperthermic Arenic Haplaquods
Jonathan	Sandy, siliceous, hyperthermic, ortstein Typic Haplohumods
Kaliga	Loamy, siliceous, dysic, hyperthermic Terric Medisaprists
Manatee	Coarse-loamy, siliceous, hyperthermic Typic Argiaquolls
Myakka	Sandy, siliceous, hyperthermic Aeric Haplaquods
Ona	Sandy, siliceous, hyperthermic Typic Haplaquods
Placid	Sandy, siliceous, hyperthermic Typic Humaquepts
Pomello	Sandy, siliceous, hyperthermic Arenic Haplohumods
Pomona	Sandy, siliceous, hyperthermic Ultic Haplaquods
Pompano	Siliceous, hyperthermic Typic Psammaquents
Popash	Loamy, siliceous, hyperthermic Typic Umbraqualfs
Samsula	Sandy or sandy-skeletal, siliceous, dysic, hyperthermic Terric Medisaprists
Smyrna	Sandy, siliceous, hyperthermic Aeric Haplaquods
Sparr	Loamy, siliceous, hyperthermic Grossarenic Paleudults
St. Lucie	Hyperthermic, uncoated Typic Quartzipsamments
Tavares	Hyperthermic, uncoated Typic Quartzipsamments
Wabasso	Sandy, siliceous, hyperthermic Alfic Haplaquods
Wauchula	Sandy, siliceous, hyperthermic Ultic Haplaquods
Zolfo	Sandy, siliceous, hyperthermic Grossarenic Entic Haplohumods

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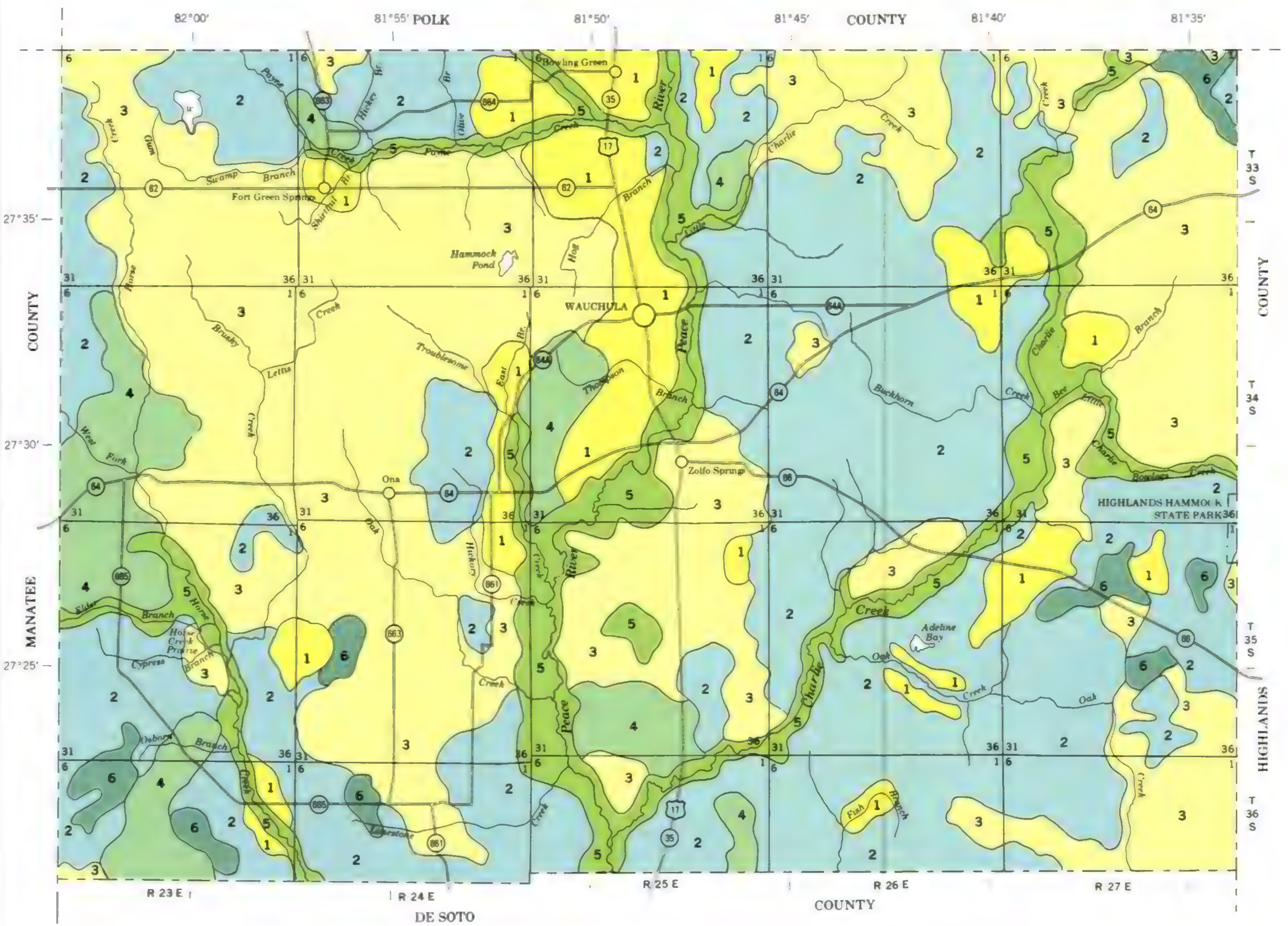
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
AND AGRICULTURAL EXPERIMENT STATIONS
SOIL SCIENCE DEPARTMENT
FLORIDA DEPARTMENT OF AGRICULTURE
AND CONSUMER SERVICE

GENERAL SOIL MAP

HARDEE COUNTY, FLORIDA



LEGEND

1 ZOLFO-TAVARES: Nearly level to gently sloping, somewhat poorly drained and moderately well drained soils that are sandy throughout

2 SMYRNA-MYAKKA-ONA: Nearly level, poorly drained soils that are sandy throughout and that have a dark colored subsoil at a depth of less than 30 inches

3 POMONA-FLORIDANA-POPASH: Nearly level, poorly drained and very poorly drained sandy soils; some have a dark colored subsoil at a depth of less than 30 inches over loamy material, and some are sandy to a depth of 20 to more than 40 inches and are loamy below

4 IMMOKALEE-POMELLO-MYAKKA: Nearly level, poorly drained and moderately well drained soils that are sandy throughout; some have a dark colored subsoil at a depth of 30 to 50 inches, and some at a depth of less than 30 inches

5 BRADENTON-FELDA-CHOBEE: Nearly level, poorly drained and very poorly drained soils; some are sandy to a depth of 20 to 40 inches and are loamy below, and some are loamy throughout; subject to frequent flooding

6 KALIGA-SAMSULA: Nearly level, very poorly drained organic soils; the organic material extends to a depth of 16 to 51 inches; some soils are underlain by loamy material, and some by sandy material

Compiled 1982

Scale 1:190,080

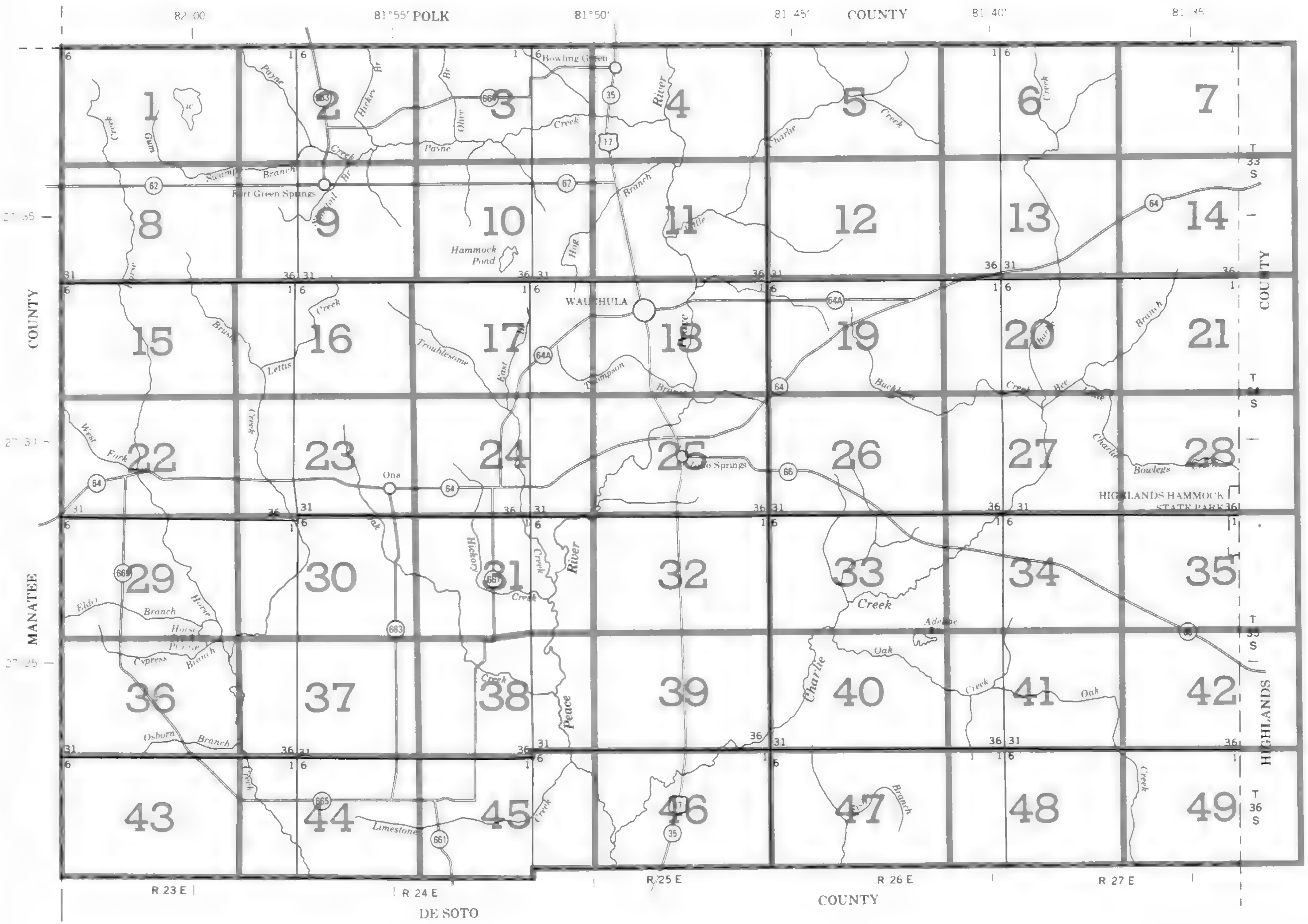
1 0 1 2 3 Miles

1 0 3 6 Km

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS

HARDEE COUNTY, FLORIDA

Original text from each individual map sheet read:

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1970 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL LEGEND

Map units are in numerical order in the text of the survey. The alphabetical legend is for the convenience of those wanting a quick reference to the names of the soils mapped in the survey. Names without slope designation are miscellaneous areas or for map units with nearly level slopes or predominate slope gradients of less than two percent.

NUMERIC LEGEND

SYMBOL	NAME
1	Adamsville fine sand
2	Zolfo fine sand
3	Ft. Green fine sand, 2 to 5 percent slopes
4	Apopka fine sand, 0 to 5 percent slopes
5	Tavares fine sand, 0 to 5 percent slopes
6	Candler fine sand, 0 to 5 percent slopes
7	Basinger fine sand
8	Bradenton loamy fine sand, frequently flooded
9	Popash mucky fine sand
10	Pomona fine sand
11	Felda fine sand
12	Felda fine sand, frequently flooded
13	Floridana mucky fine sand, depressional
15	Immokalee fine sand
16	Myakka fine sand
17	Smyrna sand
18	Cassia fine sand
19	Ona fine sand
20	Samsula muck
21	Placid fine sand, depressional
22	Pomello fine sand
23	Sparr fine sand
24	Jonathan sand
25	Wabasso fine sand
26	Electra sand
27	Bradenton-Fleda-Chobee assoc., frequently flooded
28	Holopaw fine sand
29	Pits
30	Hontoon muck
31	Pompano fine sand, frequently flooded
32	Felda fine sand, depressional
33	Manatee mucky fine sand, depressional
34	Wauchula fine sand
35	Farmton fine sand
36	Kaliga muck
37	Basinger fine sand, depressional
38	St. Lucie fine sand
39	Bradenton loamy fine sand

ALPHABETIC LEGEND

SYMBOL	NAME
1	Adamsville fine sand
4	Apopka fine sand, 0 to 5 percent slopes
7	Basinger fine sand
8	Bradenton loamy fine sand, frequently flooded
27	Bradenton-Felda-Chobee assoc., frequently flooded
37	Basinger fine sand, depressional
39	Bradenton loamy fine sand
6	Candler fine sand, 0 to 5 percent slopes
18	Cassia fine sand
26	Electra sand
35	Farmton fine sand
11	Felda fine sand
12	Felda fine sand, frequently flooded
32	Felda fine sand, depressional
13	Floridana mucky fine sand, depressional
3	Ft. Green fine sand, 2 to 5 percent slopes
28	Holopaw fine sand
30	Hontoon muck
15	Immokalee fine sand
24	Jonathan sand
36	Kaliga muck
33	Manatee mucky fine sand, depressional
16	Myakka fine sand
19	Ona fine sand
29	Pits
21	Placid fine sand, depressional
22	Pomello fine sand
31	Pompano fine sand, frequently flooded
9	Popash mucky fine sand
20	Samsula muck
17	Smyrna sand
23	Sparr fine sand
38	St. Lucie fine sand
5	Tavares fine sand, 0 to 5 percent slopes
25	Wabasso fine sand
34	Wauchula fine sand
2	Zolfo fine sand

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

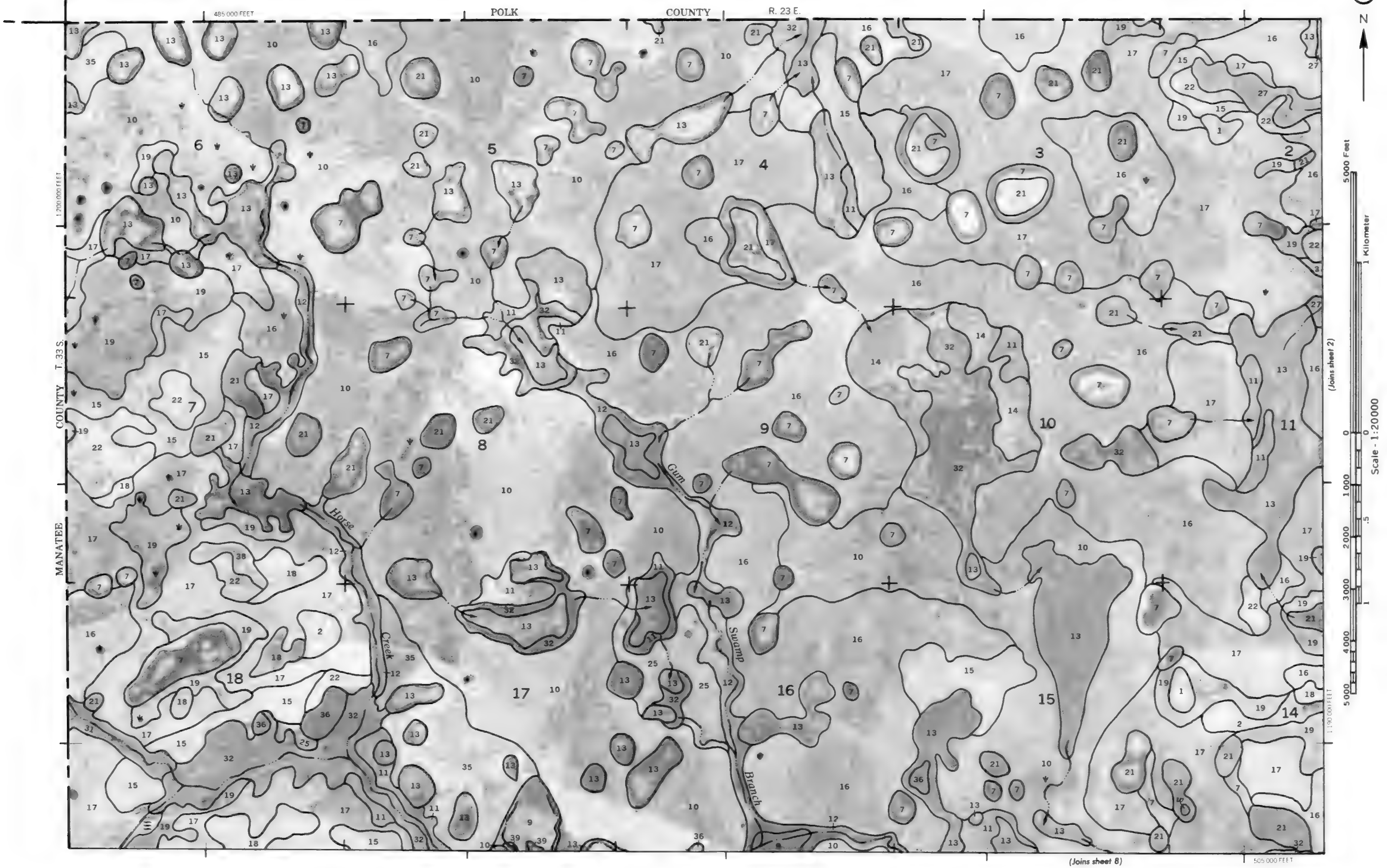
DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

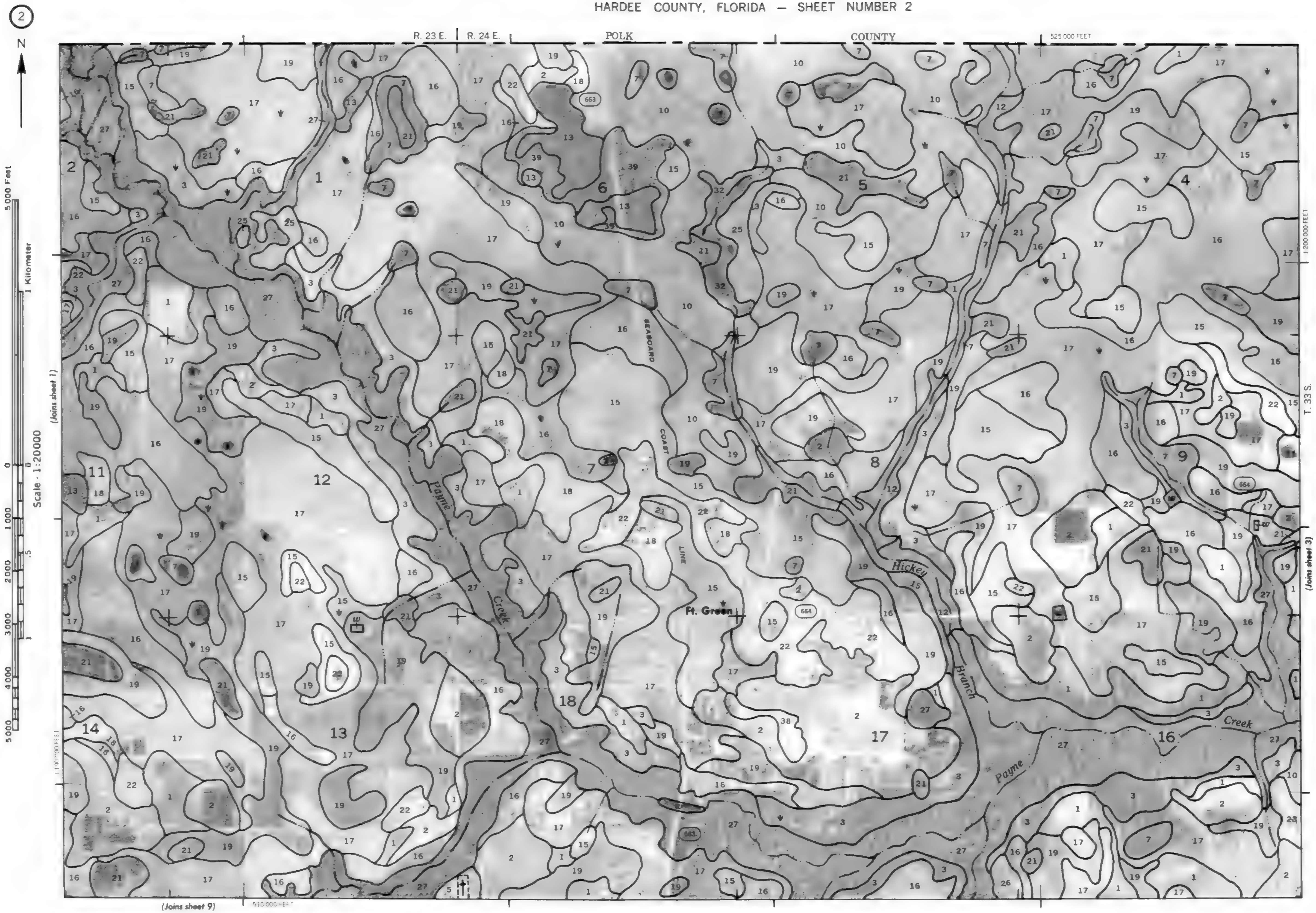
MISCELLANEOUS

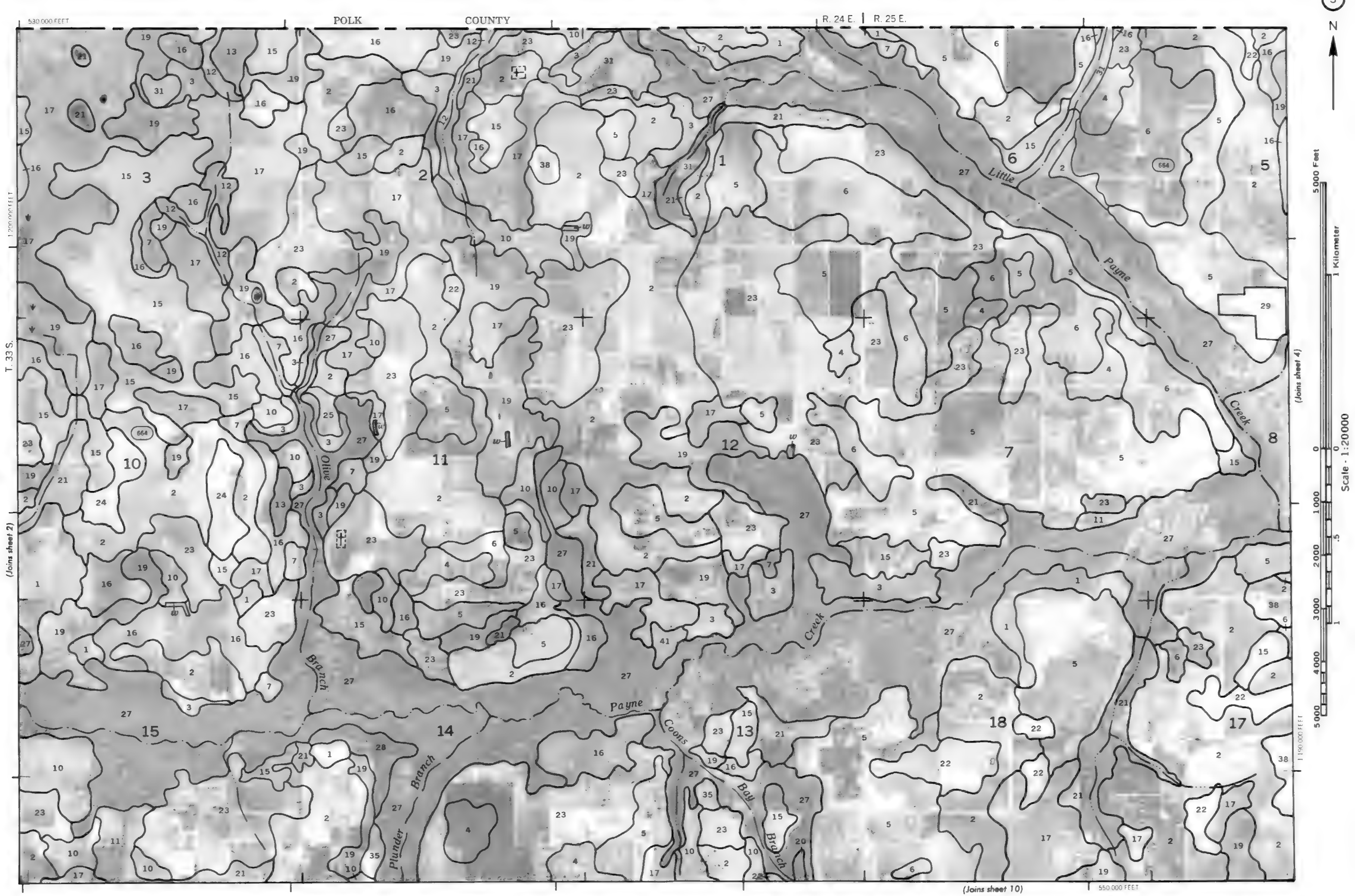
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

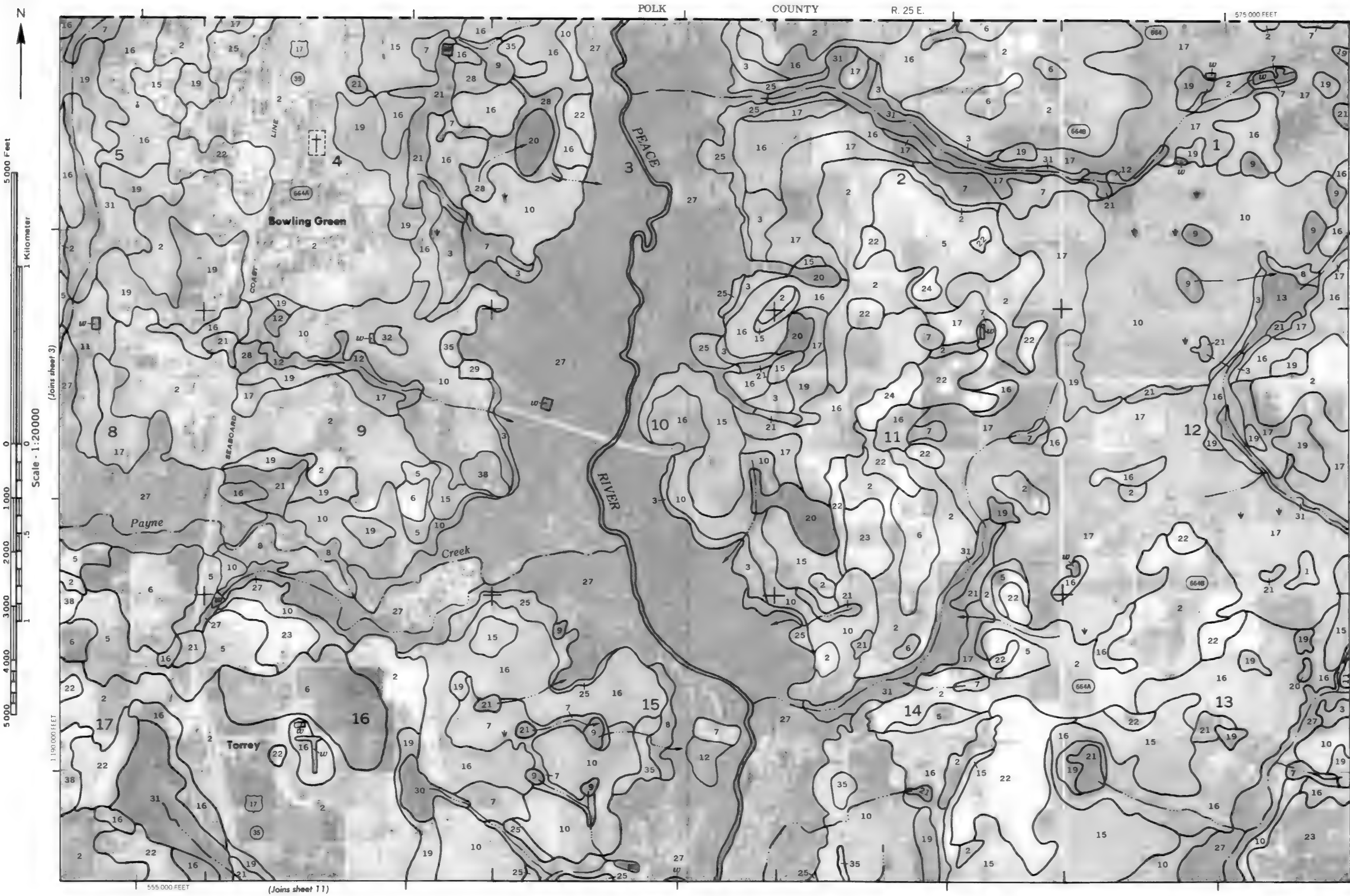
HARDEE COUNTY, FLORIDA — SHEET NUMBER 1



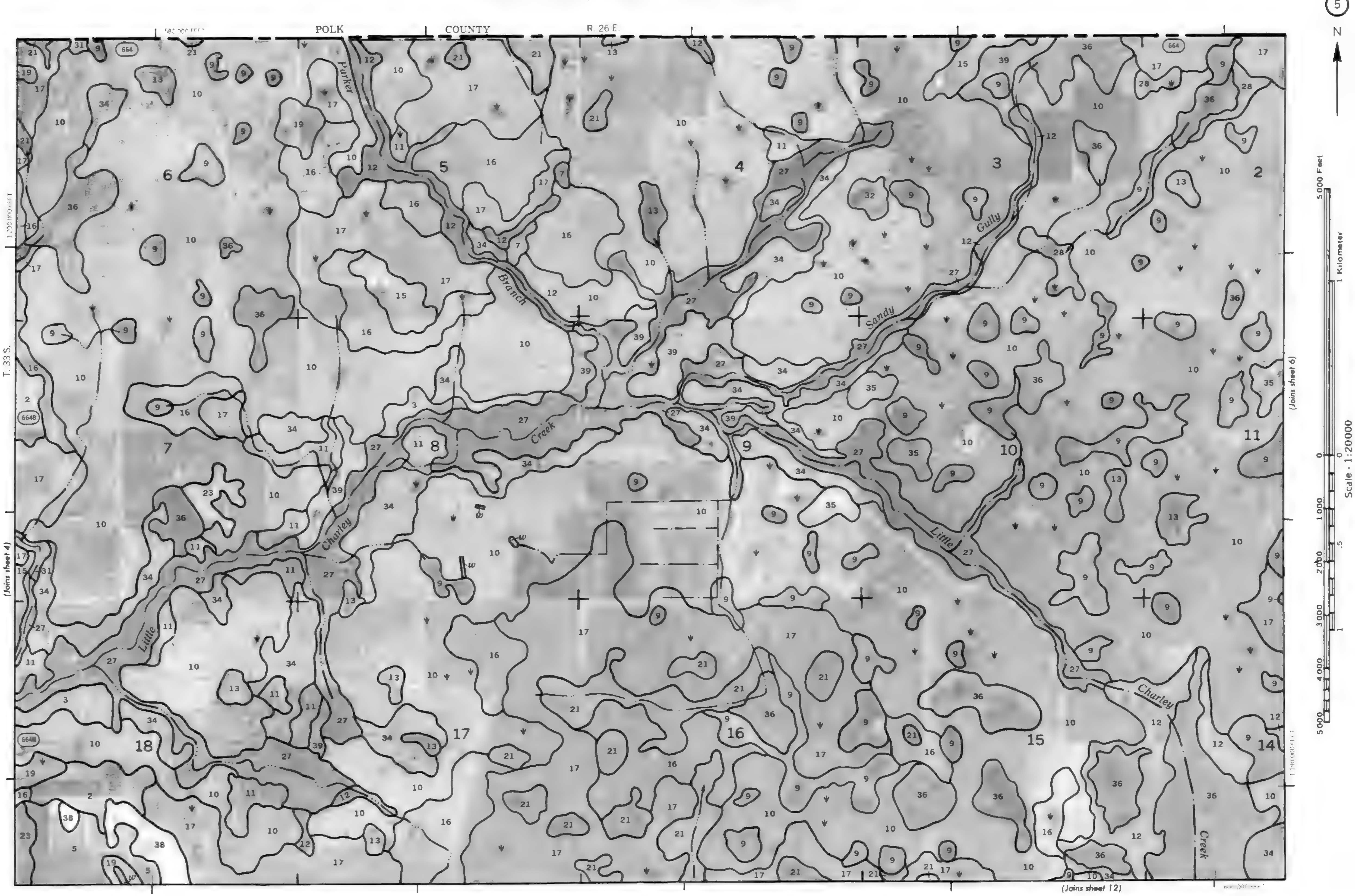
HARDEE COUNTY, FLORIDA — SHEET NUMBER 2

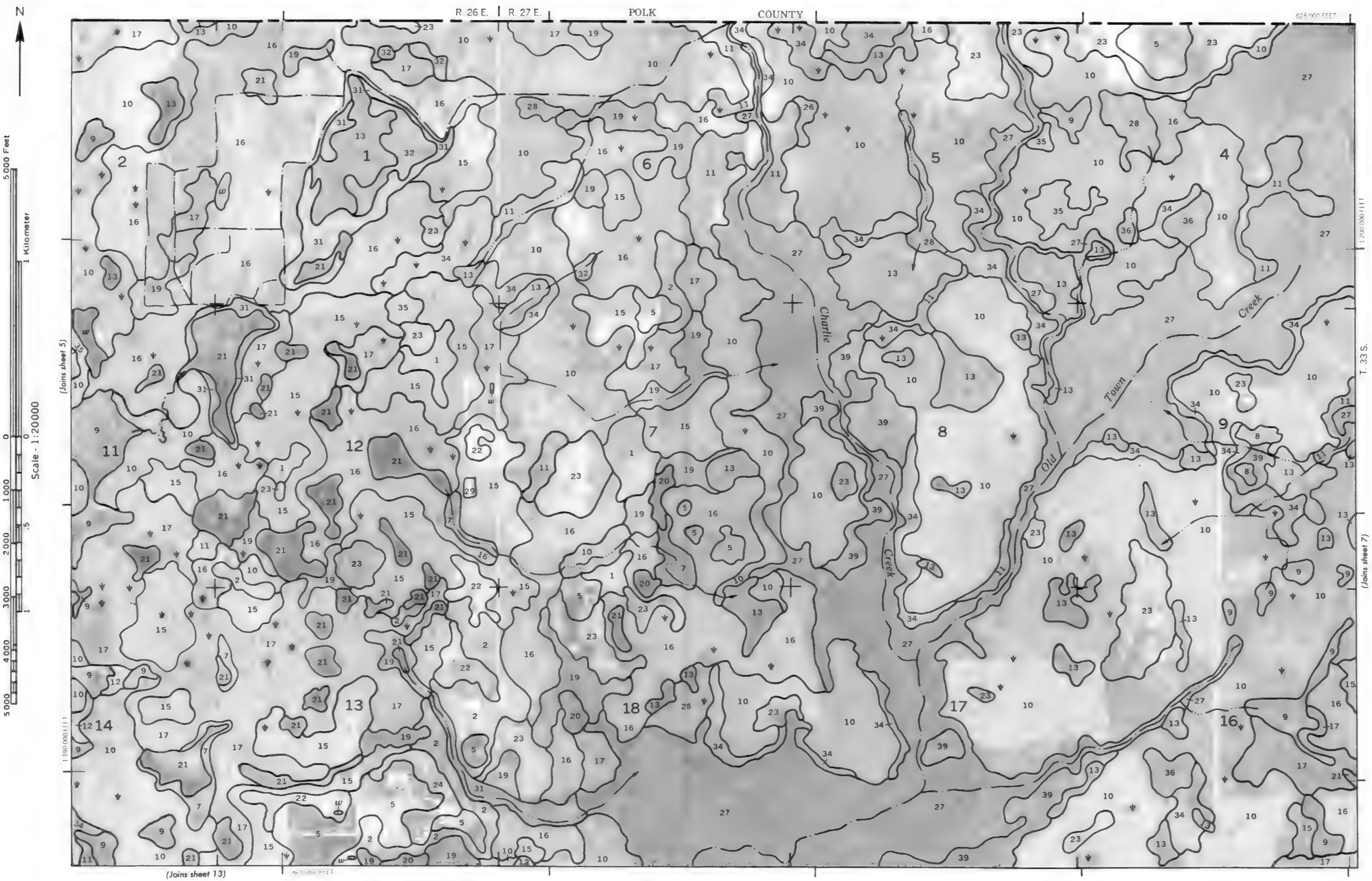


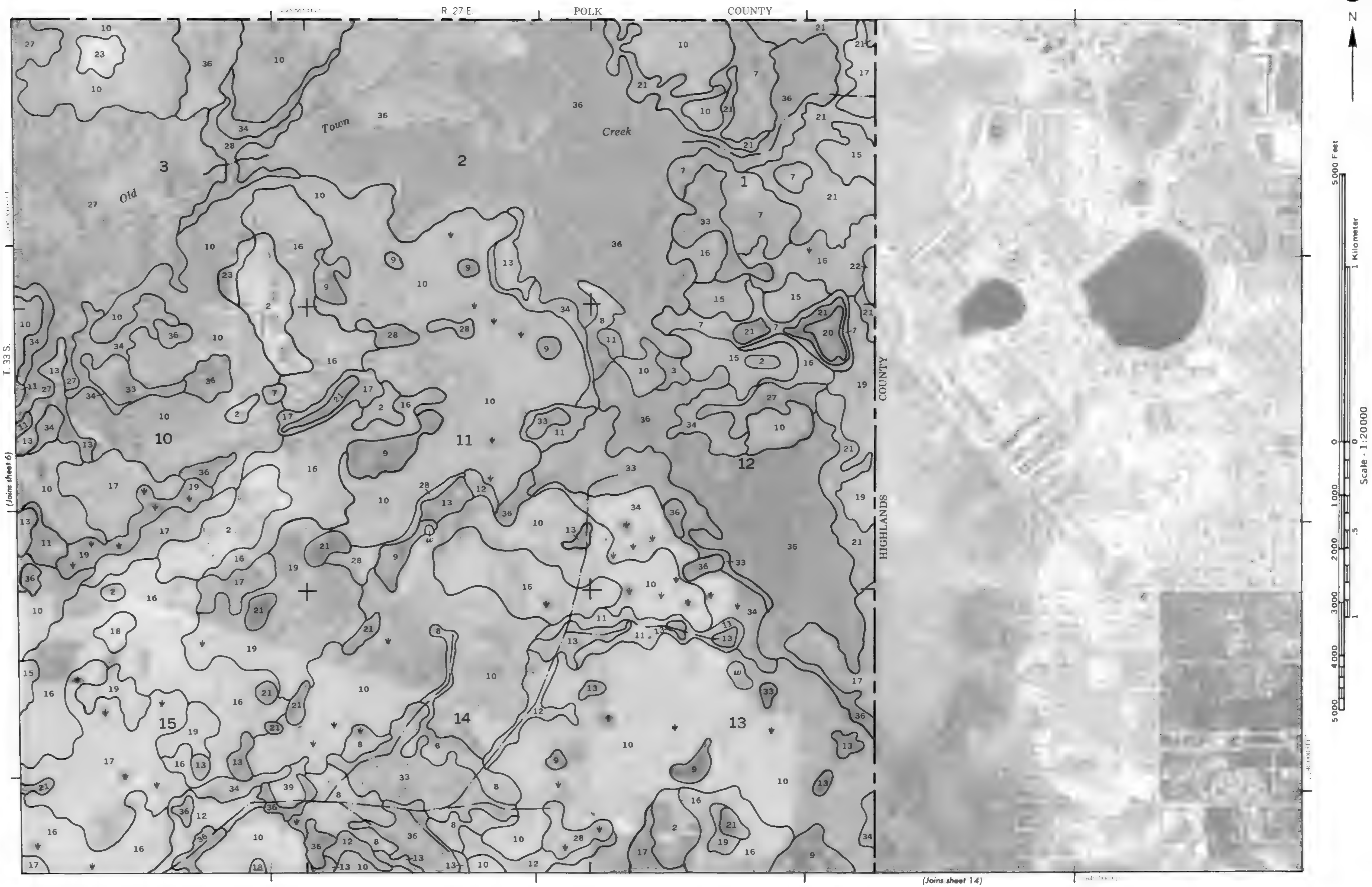

POLK COUNTY
R. 24 E. | R. 25 E.
530 000 FEET
550 000 FEET
1 200 000 FEET
1 190 000 FEET
T. 33 S.
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 10)
Little Payne Creek
Olive Branch
Payne Creek
Plunder Branch
Coons Bay Branch
N
5000 Feet
1 Kilometer
Scale - 1:20000

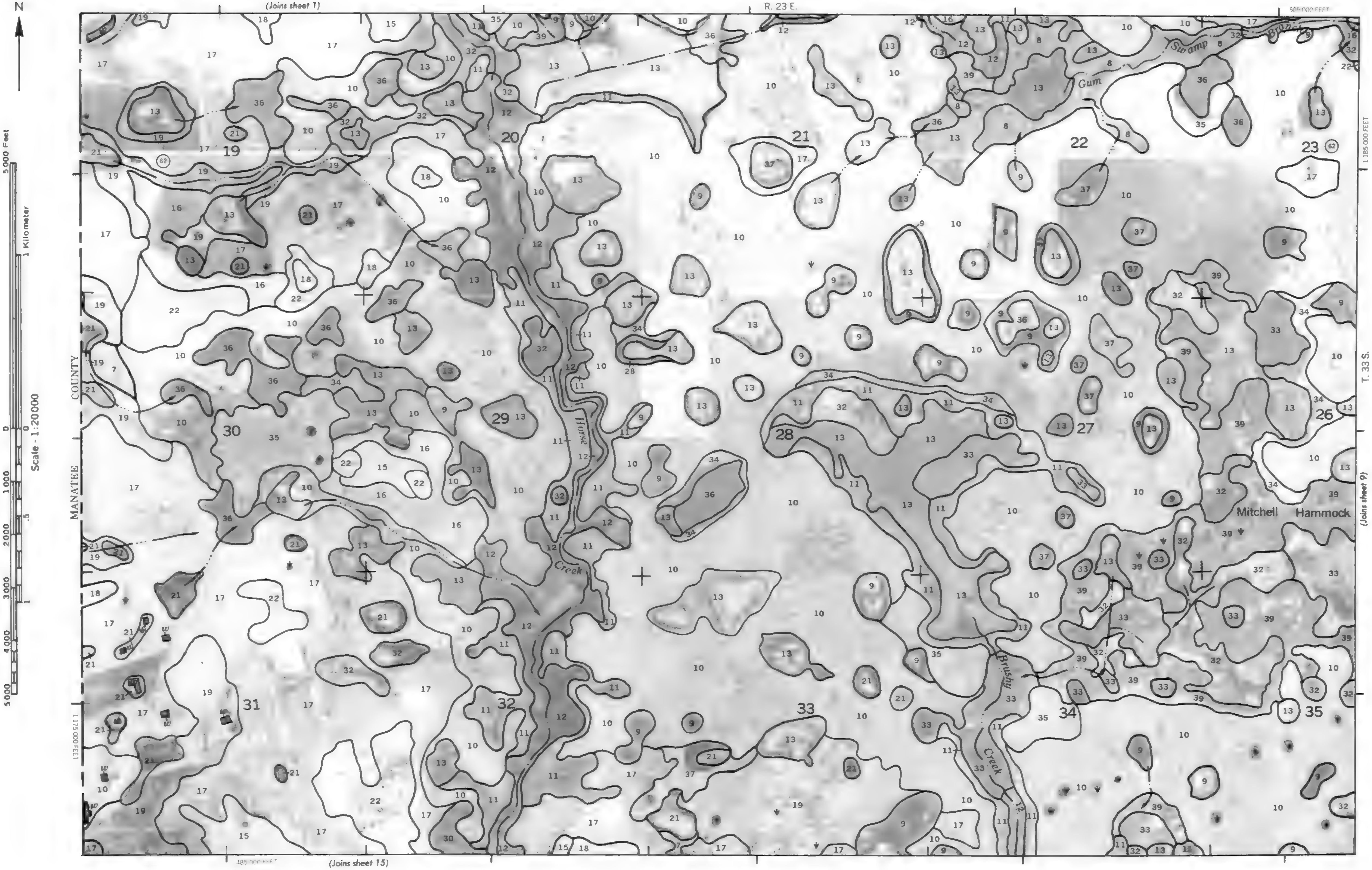

N
POLK
COUNTY
R. 25 E.
575 000 FEET
Bowling Green
Torrey
PEACE
RIVER
Payne
Creek
SEABOARD
COAST
LINE
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 11)
T. 33 S.
1 200 000 FEET
1 190 000 FEET
555 000 FEET
5000 Feet
1 Kilometer
Scale - 1:20000

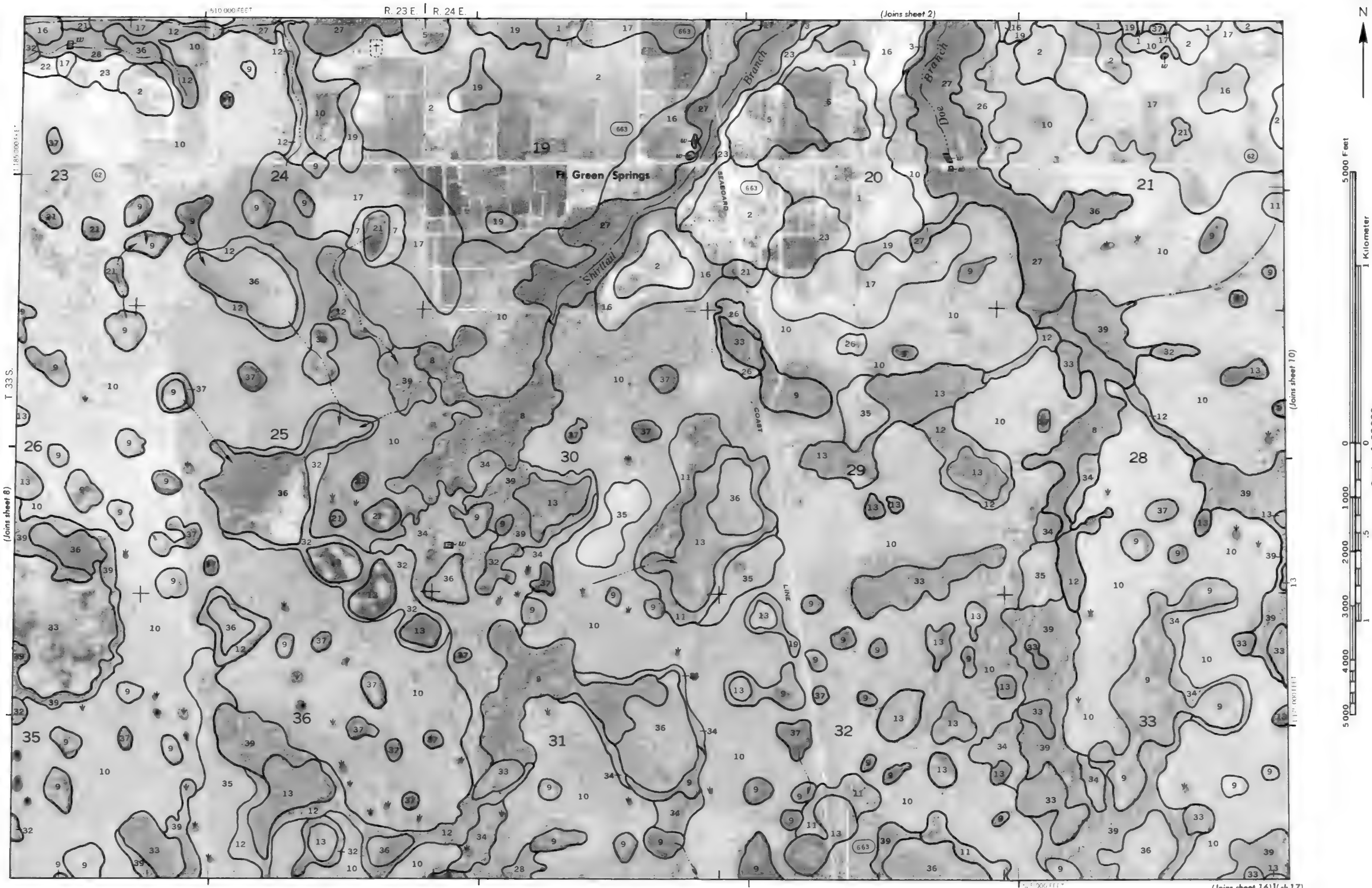
HARDEE COUNTY, FLORIDA — SHEET NUMBER 5



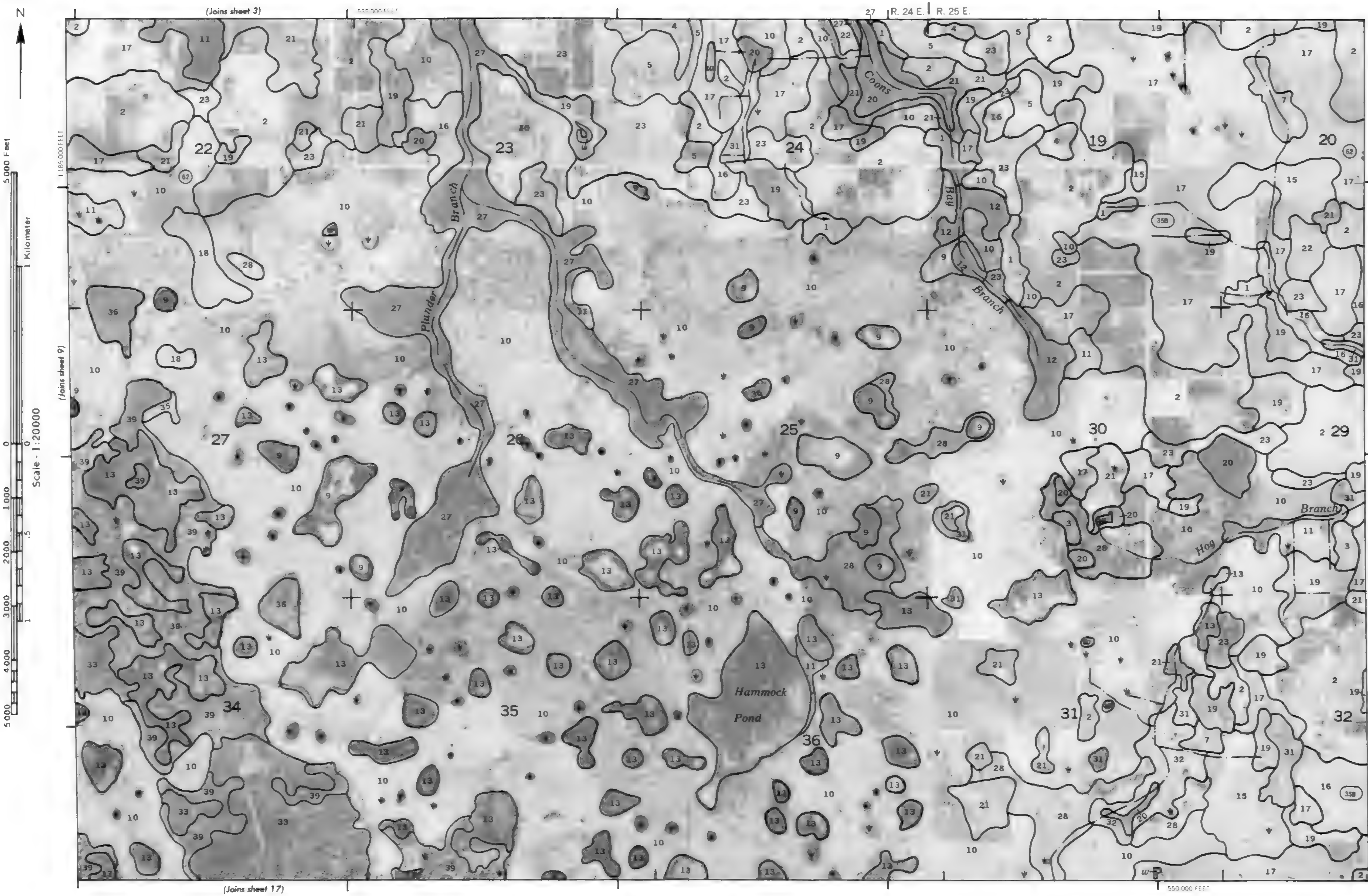

N
R. 26 E.
R. 27 E.
POLK
COUNTY
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 13)
T. 33 S.
Charlie
Creek
Old
Town
Creek
5 000 Feet
1 Kilometer
Scale 1:20000


7
N
R. 27 E.
POLK COUNTY
HIGHLANDS COUNTY
T. 33 S.
(Joins sheet 6)
(Joins sheet 14)
Old Town Creek
5 000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1

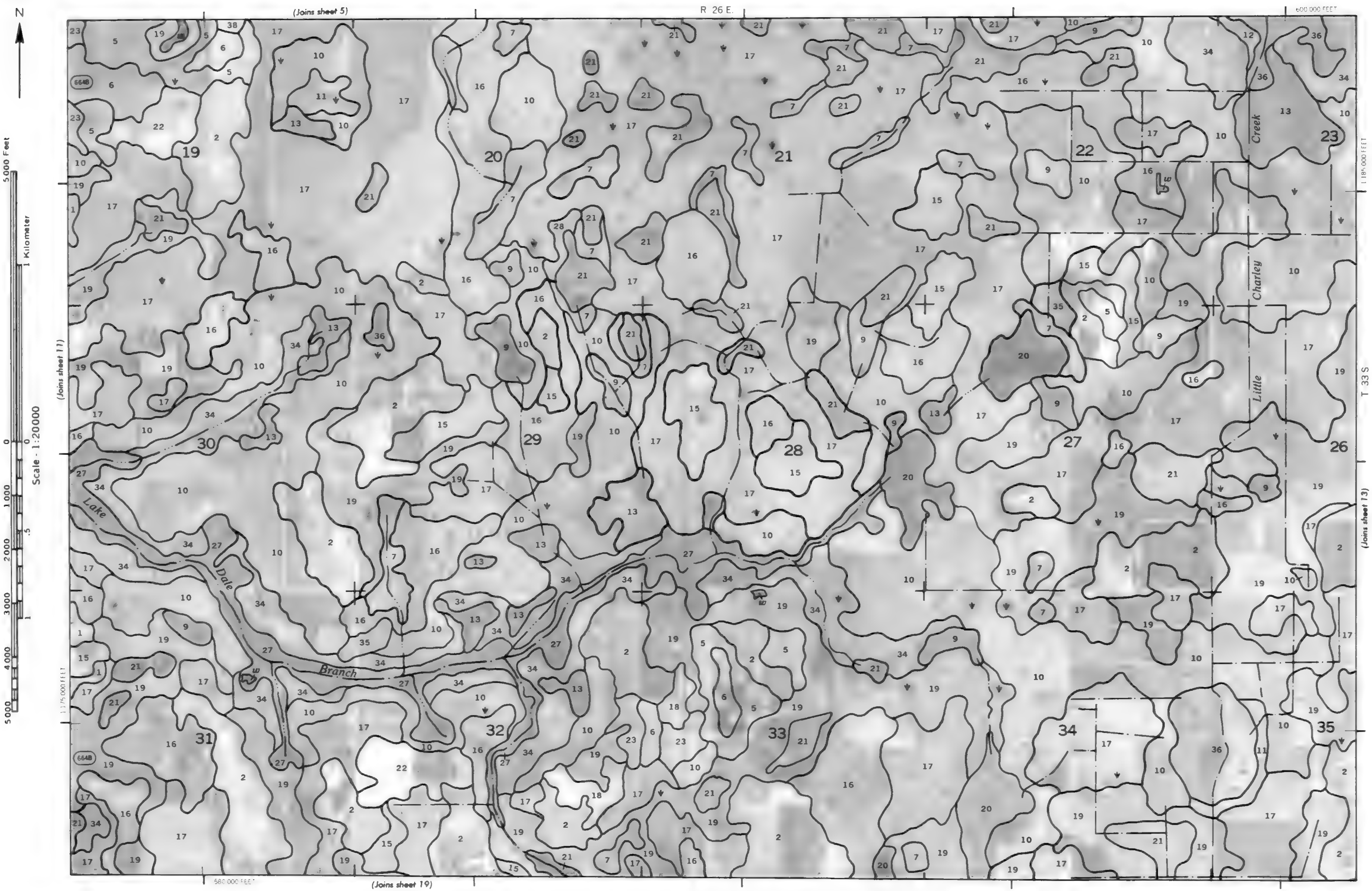

N
(Joins sheet 1)
R. 23 E.
(Joins sheet 9)
(Joins sheet 15)
T. 33 S.
MANATEE COUNTY
Horse Creek
Brushy Creek
Gum Swamp Branch
Mitchell Hammock
5000 Feet
1 Kilometer
Scale 1:20000
1 185 000 FEET
1 175 000 FEET
505 000 FEET
485 000 FEET
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35

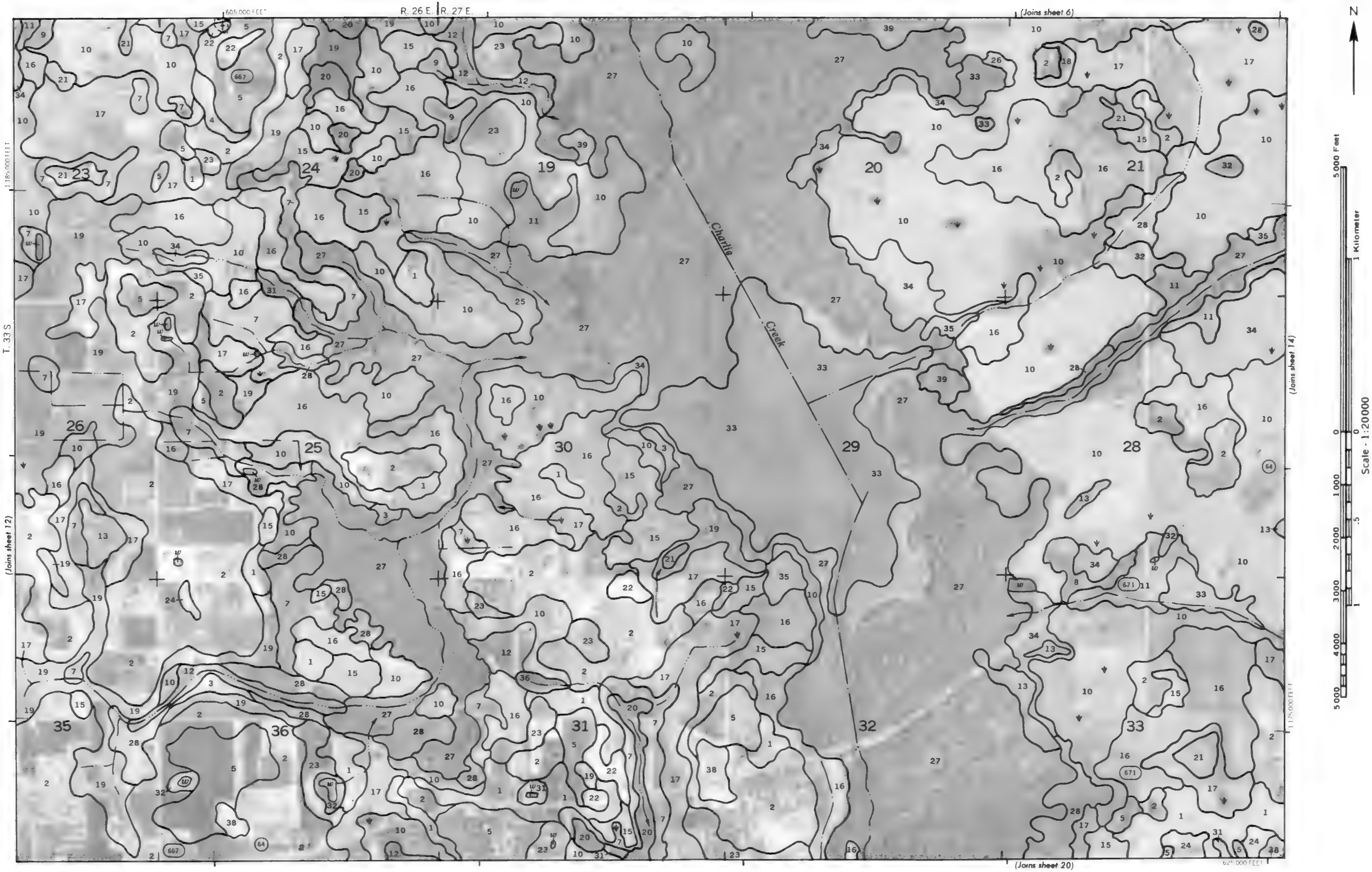

N
R. 23 E.
R. 24 E.
510 000 FEET
(Joins sheet 2)
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 16)
(sh 17)
T. 33 S.
Ft. Green Springs
Shirttail Branch
Doe Branch
SEABOARD COAST LINE
663
62
Scale - 1:20000
5000 Feet
1 Kilometer

HARDEE COUNTY, FLORIDA — SHEET NUMBER 10

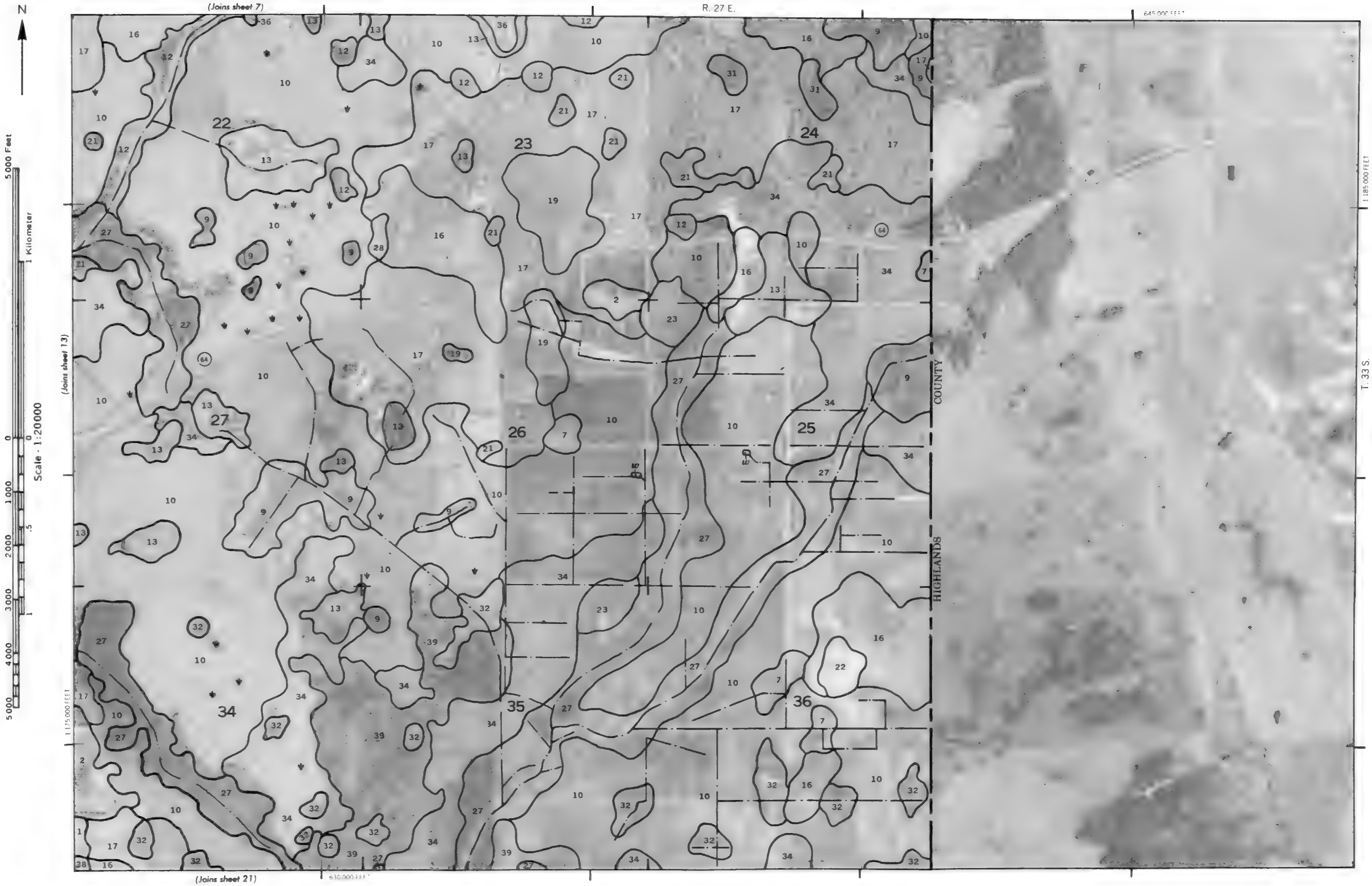


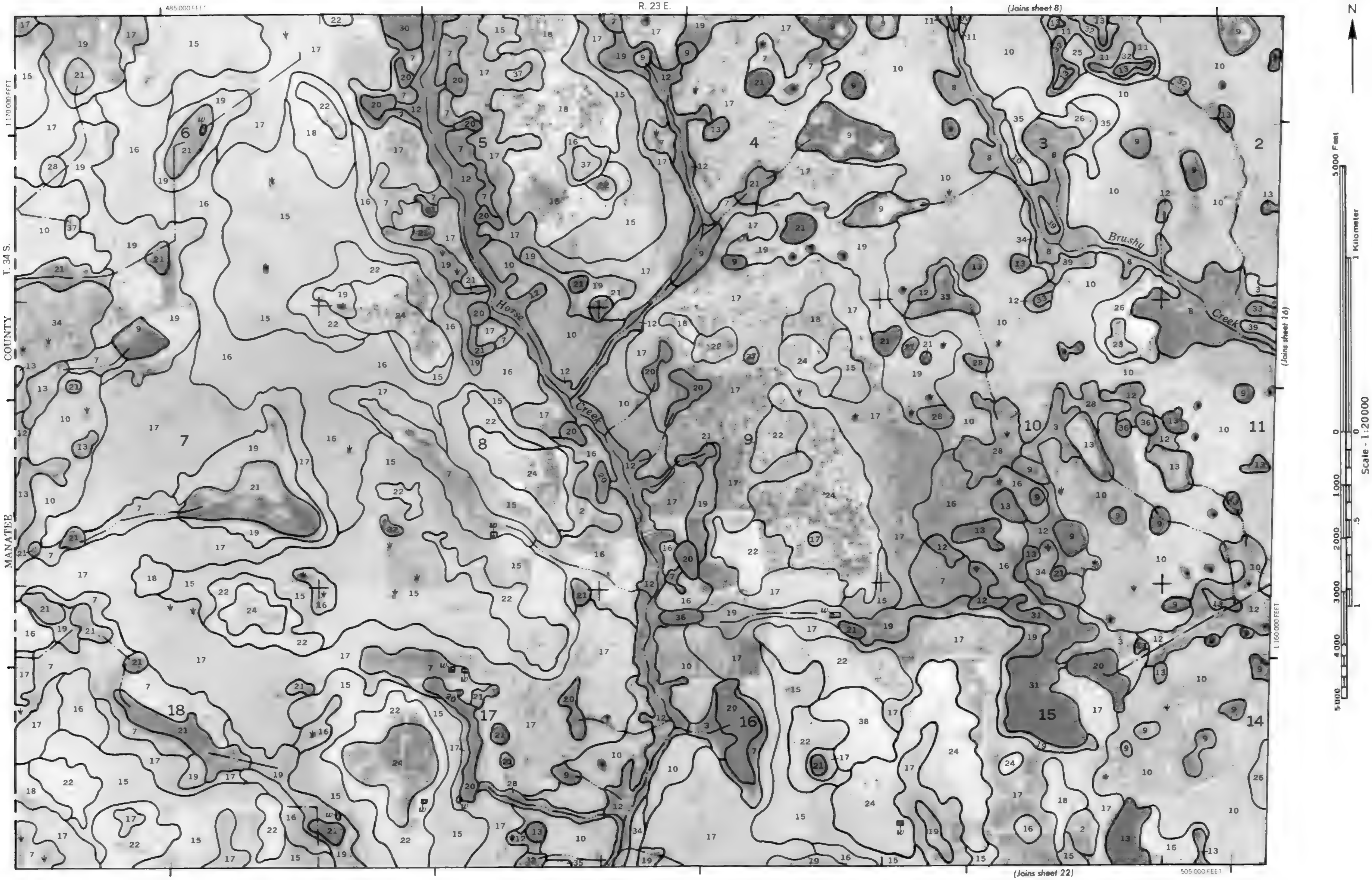

R. 25 E.
(Joins sheet 4)
T. 33 S.
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 18)
PEACE
RIVER
Hog
Branch
Little
Charley
Creek
Lake
Dale
Branch
Coker
SEABOARD
COAST
LINE
N
Scale - 1:20000
1 Kilometer
5000 Feet


N
(Joins sheet 5)
R 26 E.
600 000 FEET
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 19)
580 000 FEET
1 175 000 FEET
1 185 000 FEET
T 33 S
Lake
Dale
Branch
Little
Charley
Creek
5000 Feet
1 Kilometer
Scale - 1:20000

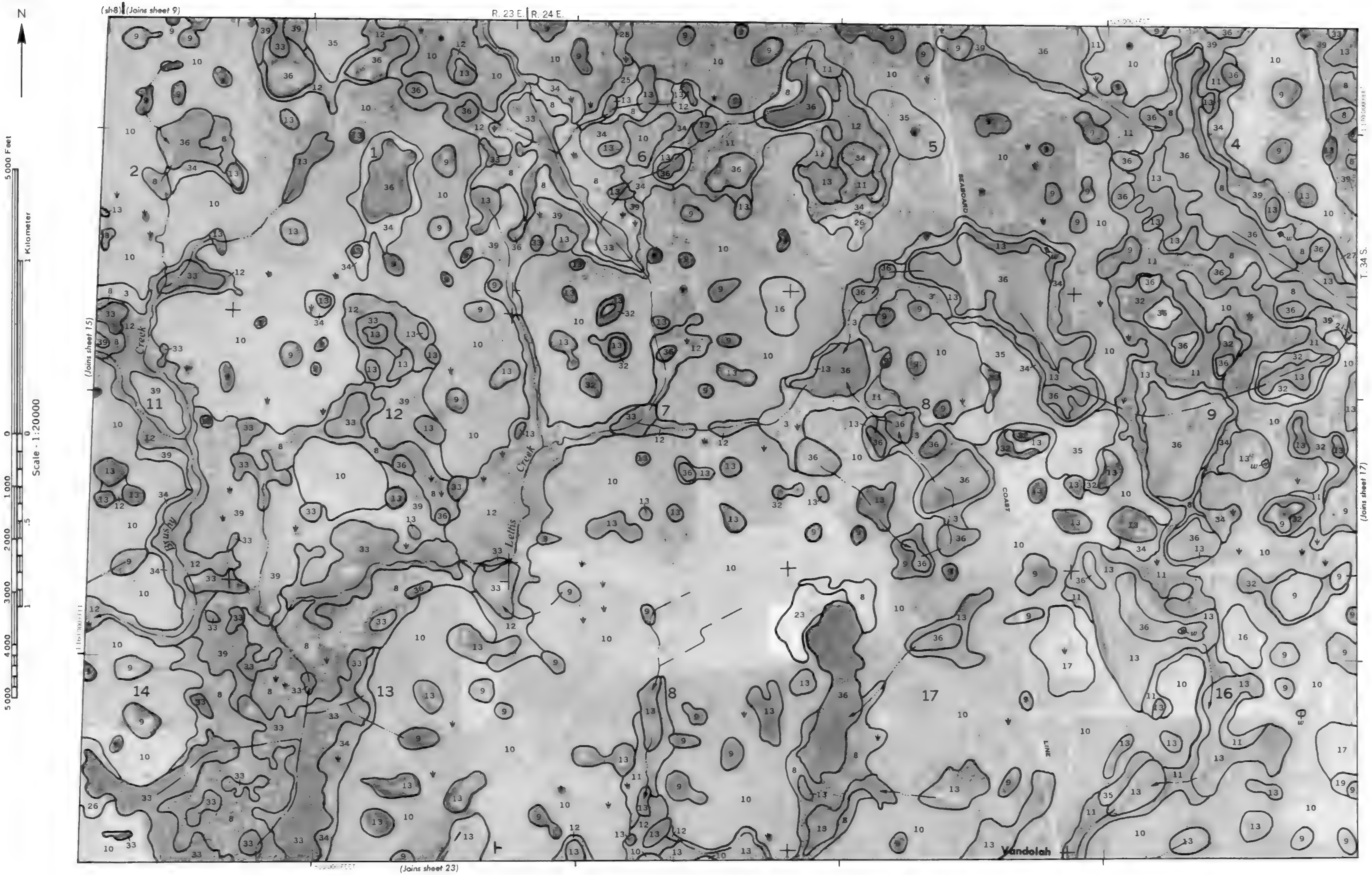

R. 26 E.
R. 27 E.
605 000 FEET
(Joins sheet 6)
(Joins sheet 14)
(Joins sheet 20)
(Joins sheet 12)
T. 33 S.
Charlie Creek
N
5000 Feet
1 Kilometer
Scale - 1:20000

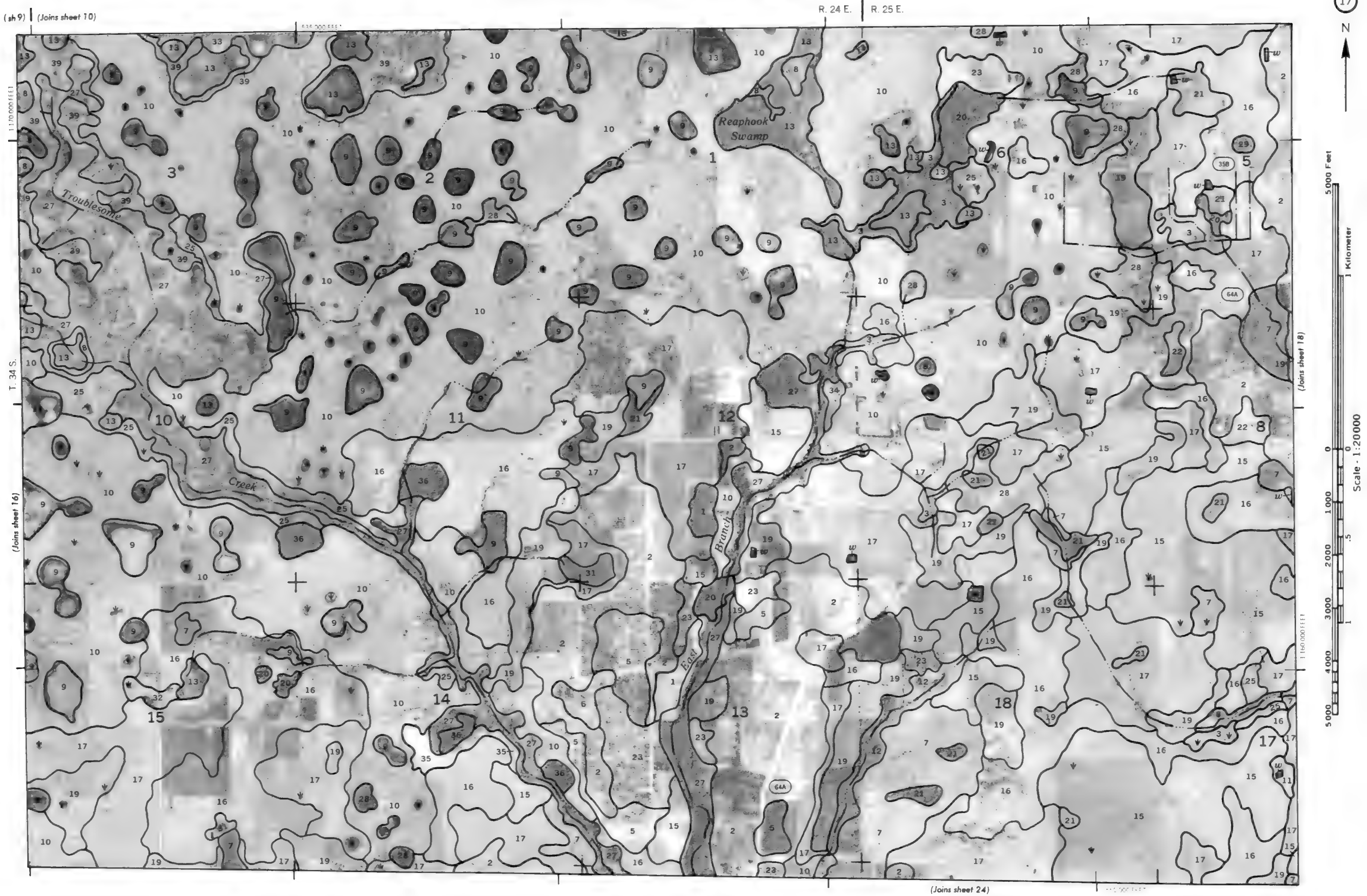
HARDEE COUNTY, FLORIDA — SHEET NUMBER 14

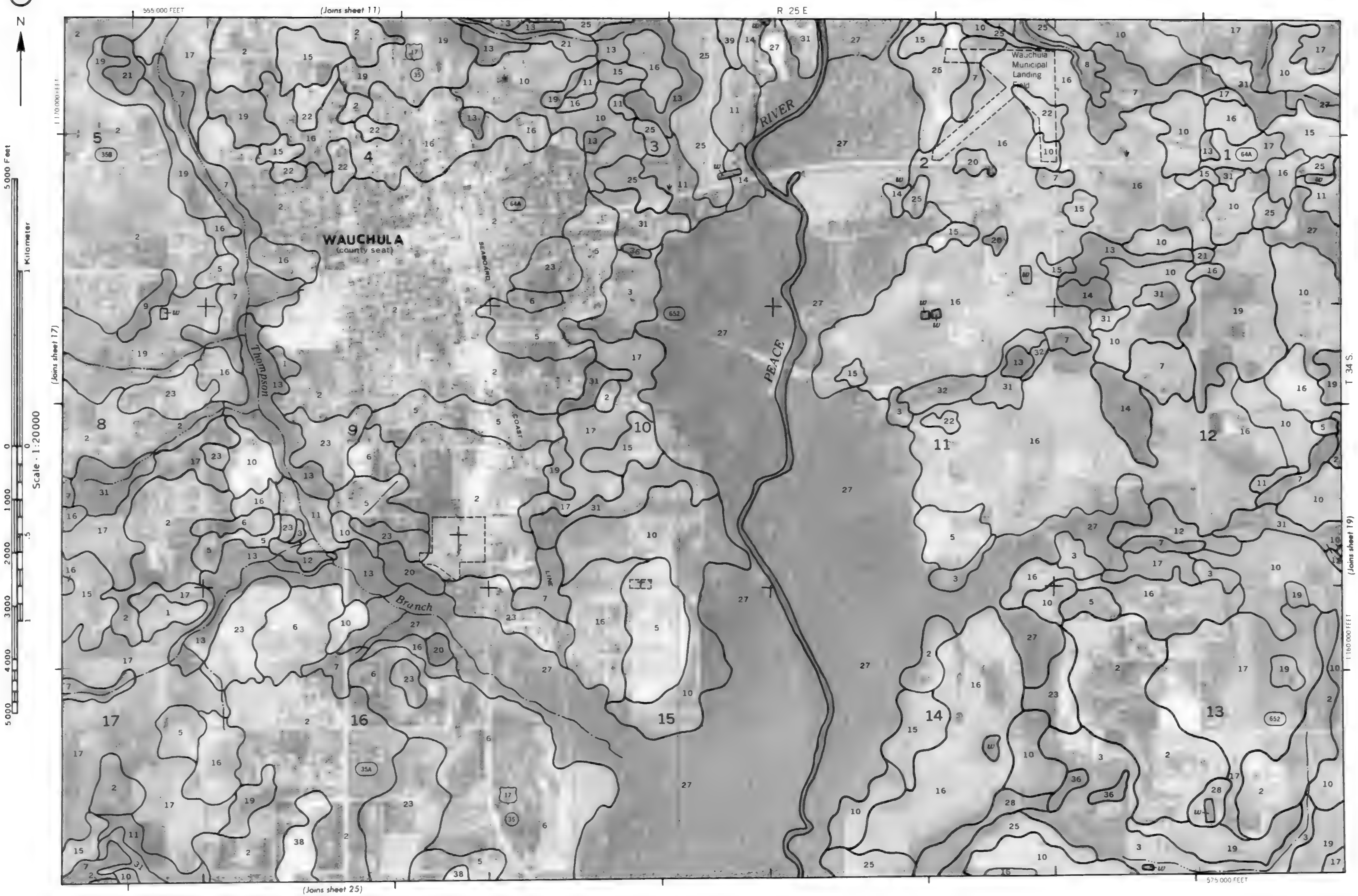


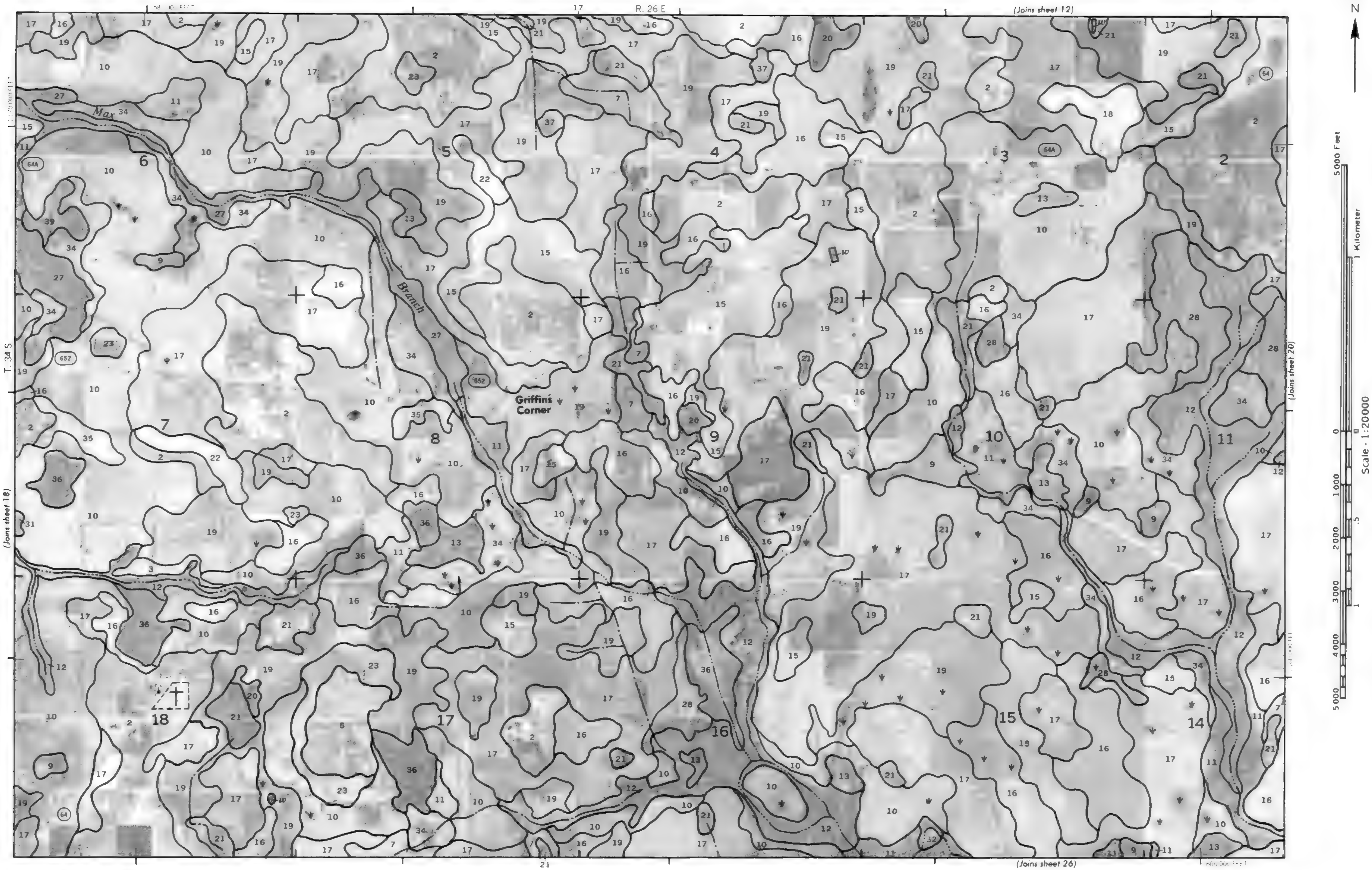


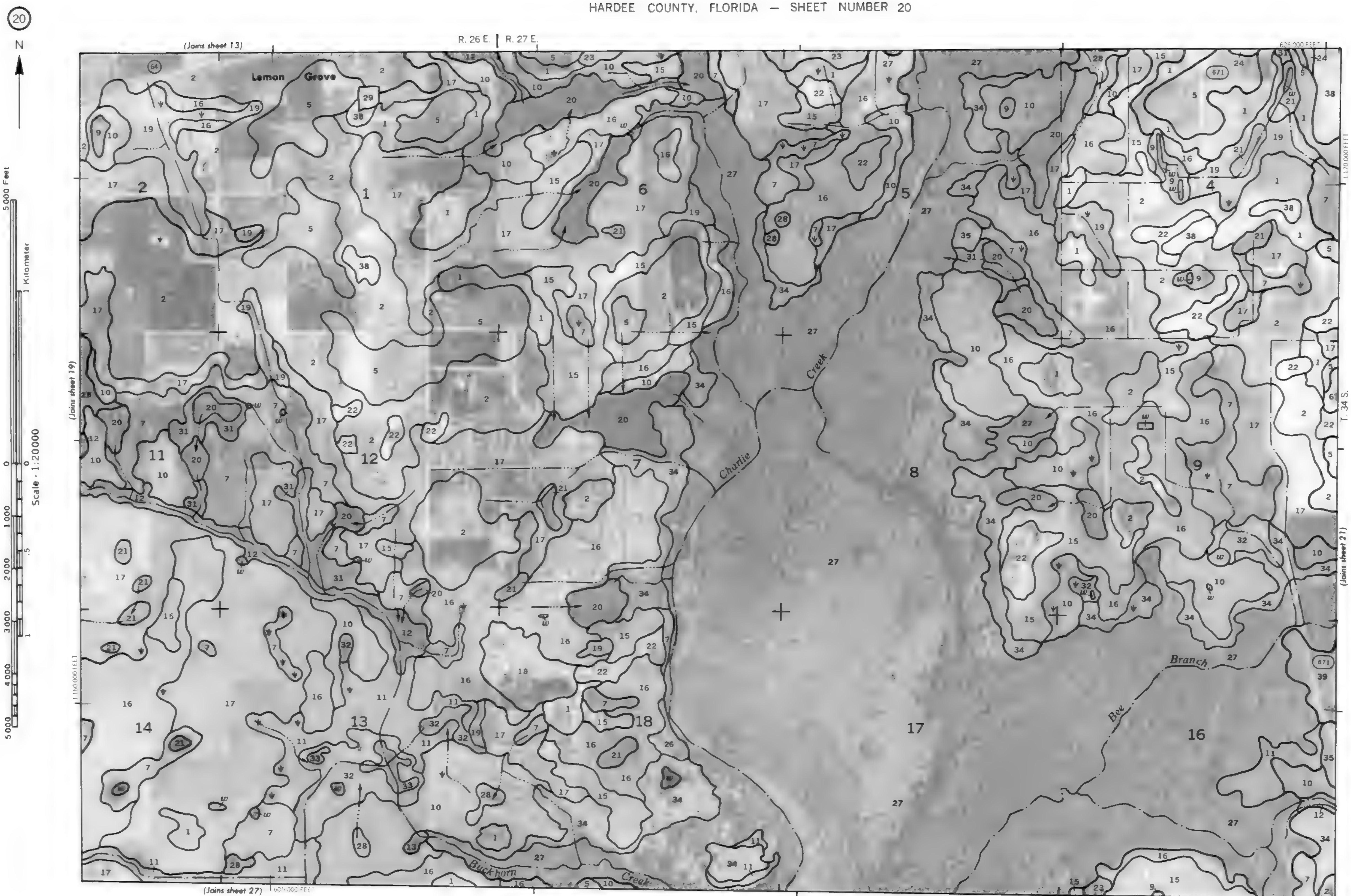
R. 23 E.
(Joins sheet 8)
485 000 FEET
1 170 000 FEET
T. 34 S.
MANATEE COUNTY
Horse Creek
Brushy Creek
(Joins sheet 16)
1 160 000 FEET
(Joins sheet 22)
505 000 FEET
N
5000 Feet
1 Kilometer
Scale - 1:20000


N
(sh8)
(Joins sheet 9)
R. 23 E.
R. 24 E.
T. 34 S.
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 23)
Bushy Creek
Lettis Creek
SEABOARD
COAST
LINE
Vandolah
5000 Feet
1 Kilometer
Scale 1:20000

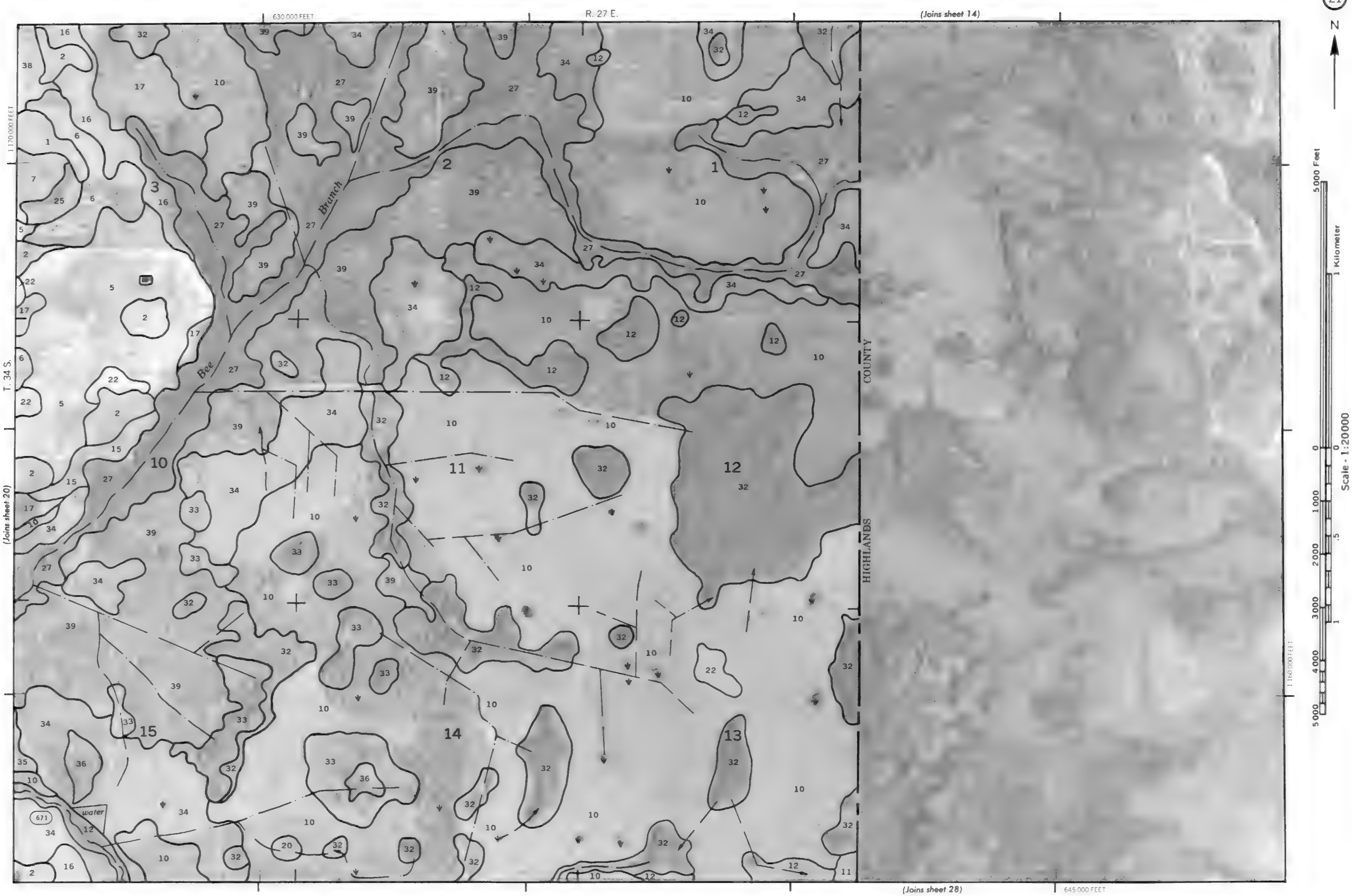

17
(sh 9)
(Joins sheet 10)
R. 24 E.
R. 25 E.
N
T. 34 S.
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 24)
Reaphook Swamp
Troublesome Creek
East Branch
5 000 Feet
1 Kilometer
Scale 1:20000

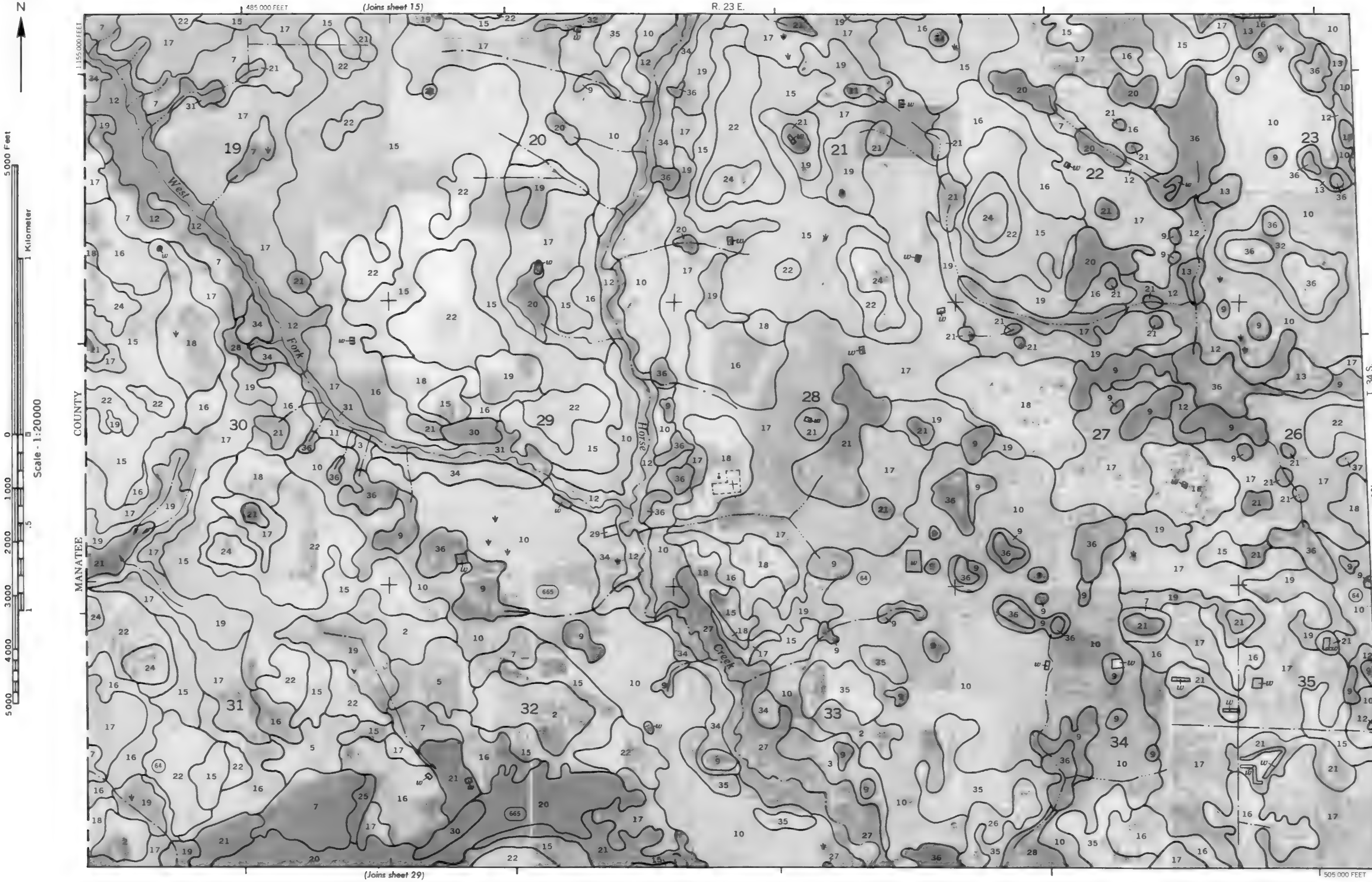

N
555 000 FEET
(Joins sheet 11)
R 25 E
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 25)
T 34 S.
1 170 000 FEET
1 160 000 FEET
575 000 FEET
5000 Feet
1 Kilometer
Scale 1:20000
WAUCHULA
(county seat)
Wauchula
Municipal
Landing
Field
PEACE
RIVER
Thompson
Branch
SEABOARD
COAST
LINE

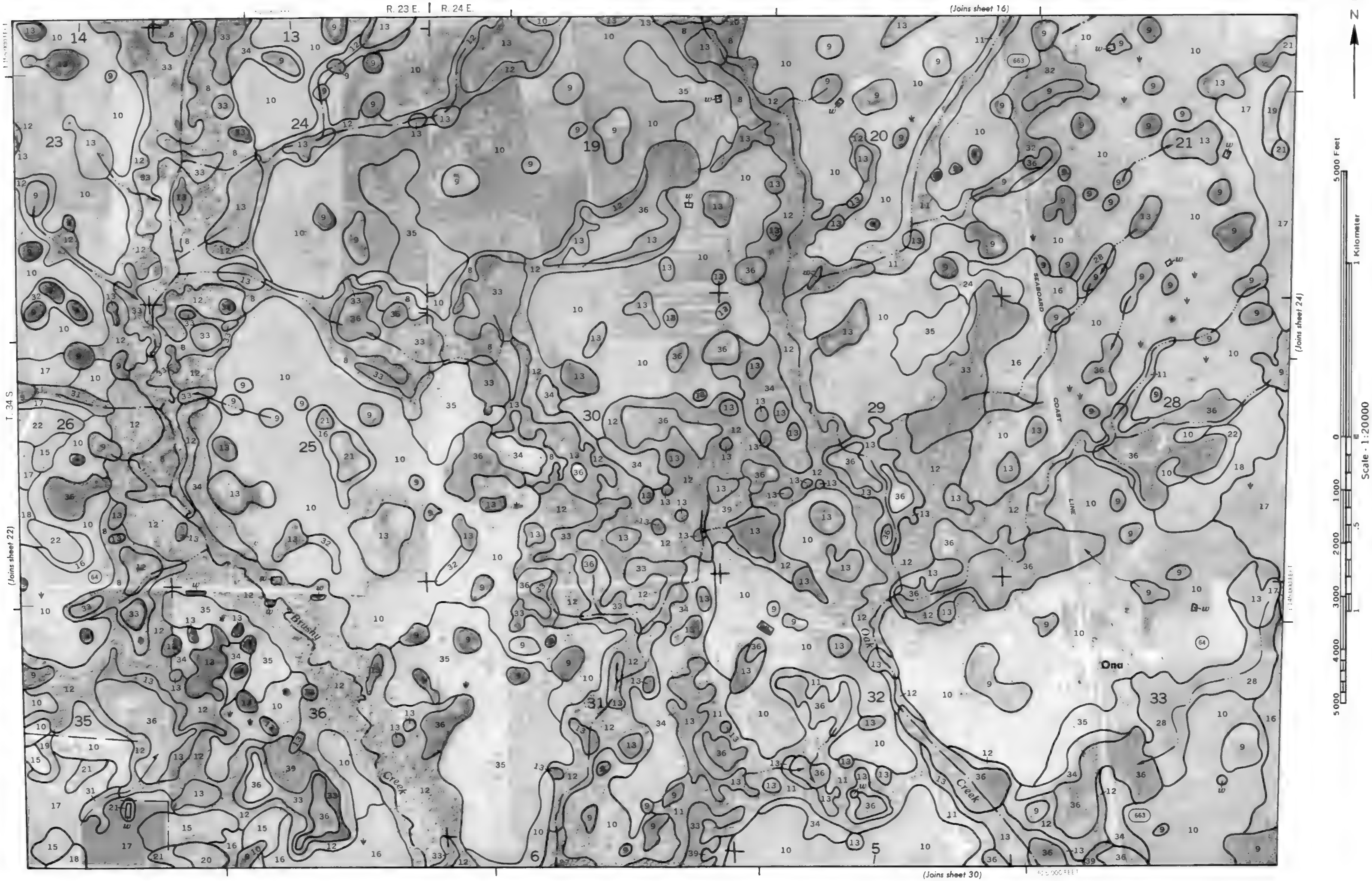

19
N
R. 26 E.
(Joins sheet 12)
(Joins sheet 18)
(Joins sheet 20)
(Joins sheet 26)
T. 34 S.
Max
Branch
Griffins
Corner
5000 Feet
1 Kilometer
Scale 1:20000


20
N
(Joins sheet 13)
R. 26 E. | R. 27 E.
Lemon Grove
Charlie Creek
Bee Branch
Buckhorn Creek
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 27)
T. 34 S.
5000 Feet
1 Kilometer
Scale - 1:20000

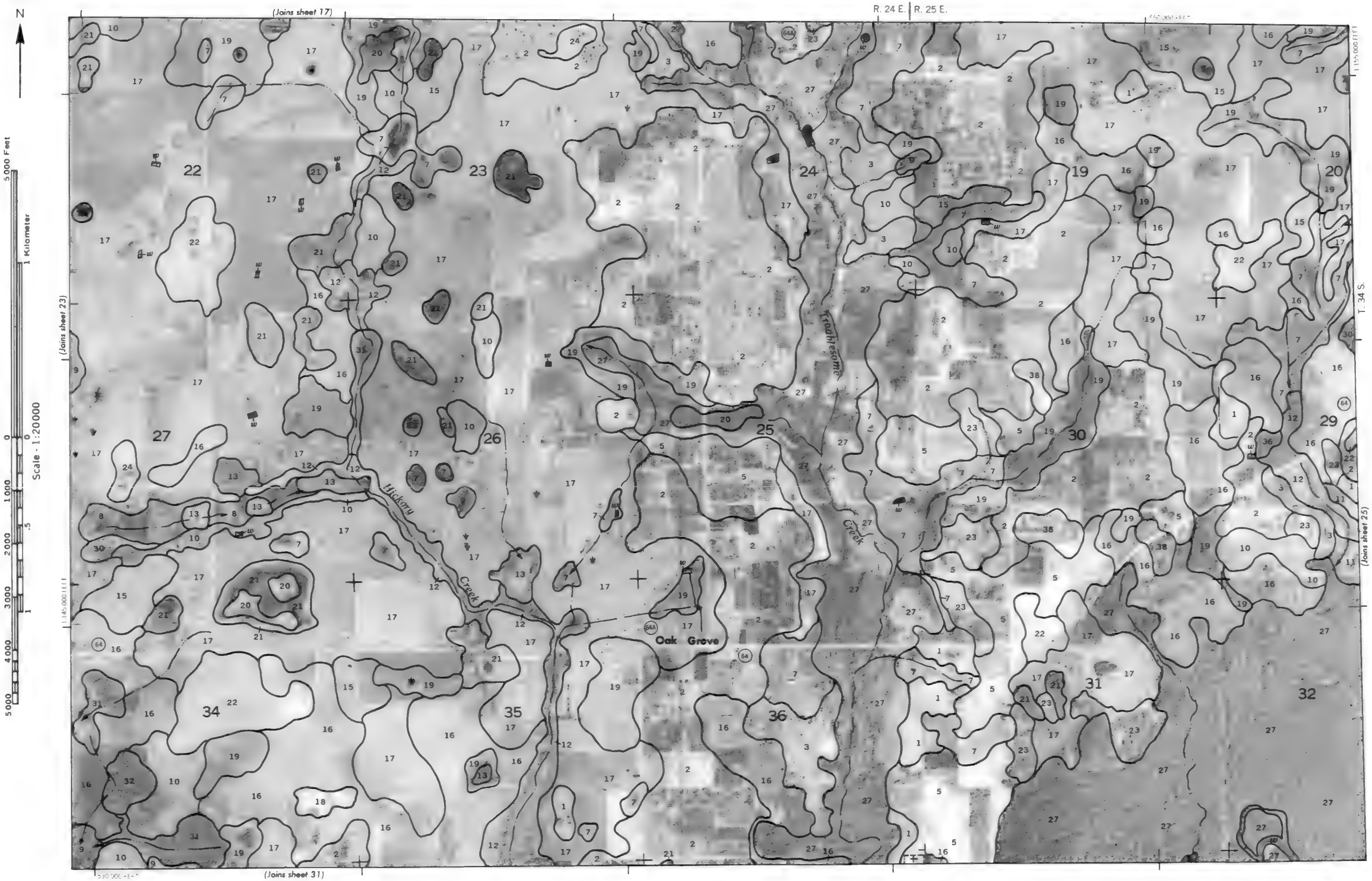
HARDEE COUNTY, FLORIDA — SHEET NUMBER 21

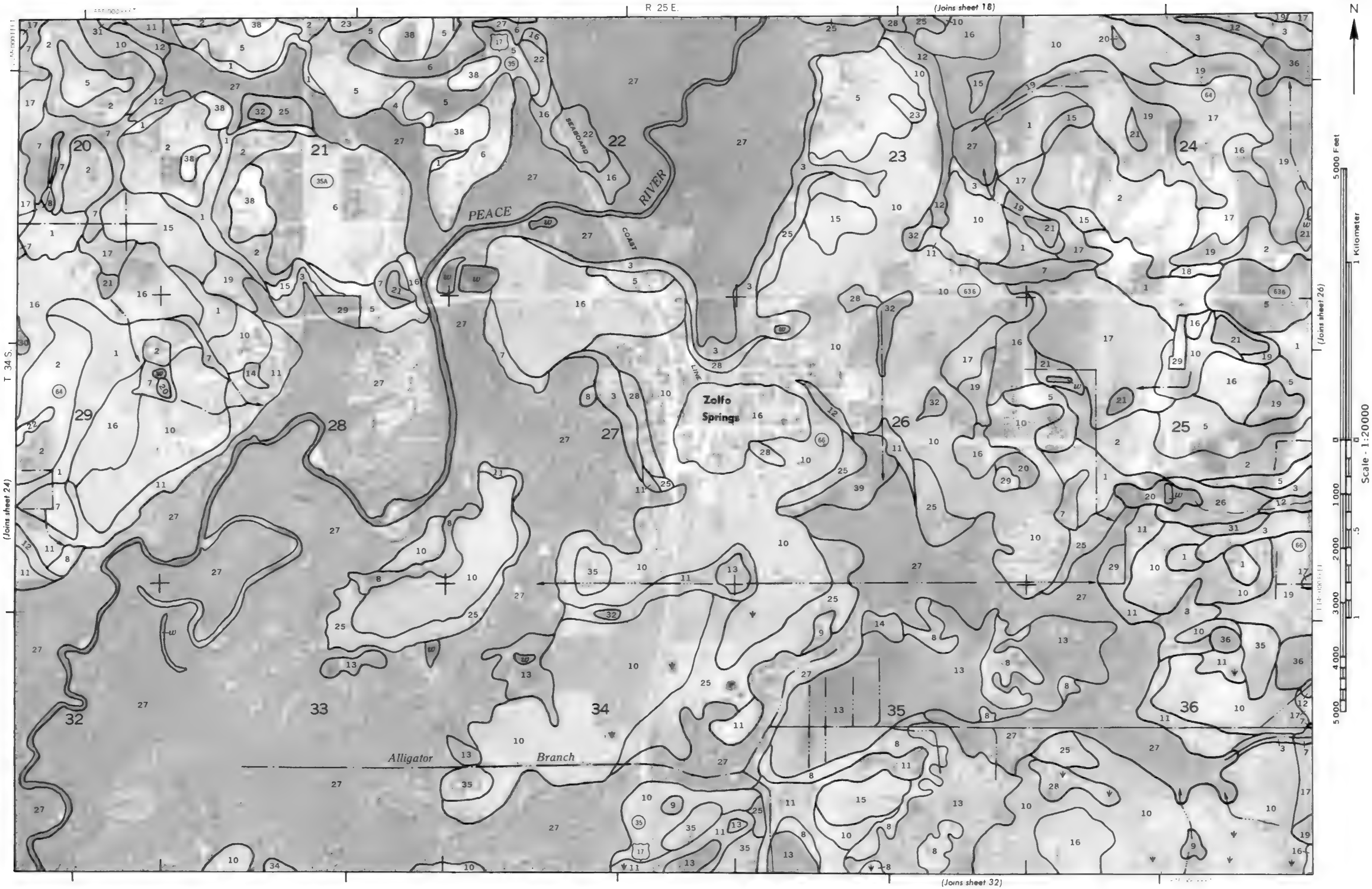


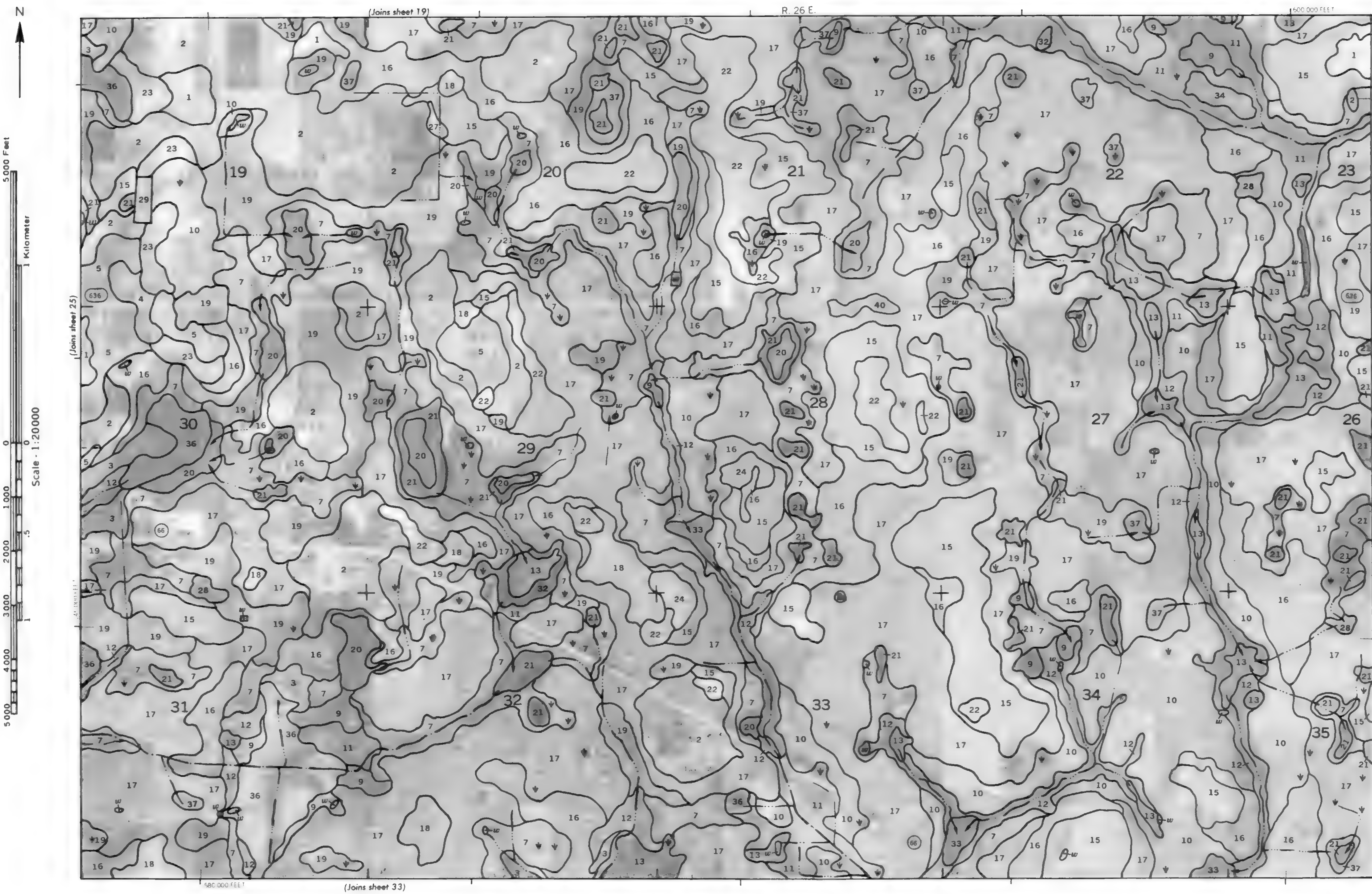

N
5000 Feet
1 Kilometer
Scale - 1:20000
485 000 FEET
(Joins sheet 15)
R. 23 E.
1 155 000 FEET
T. 34 S.
(Joins sheet 23)
1 145 000 FEET
505 000 FEET
(Joins sheet 29)
MANATEE COUNTY
West Fork
Horse Creek
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35

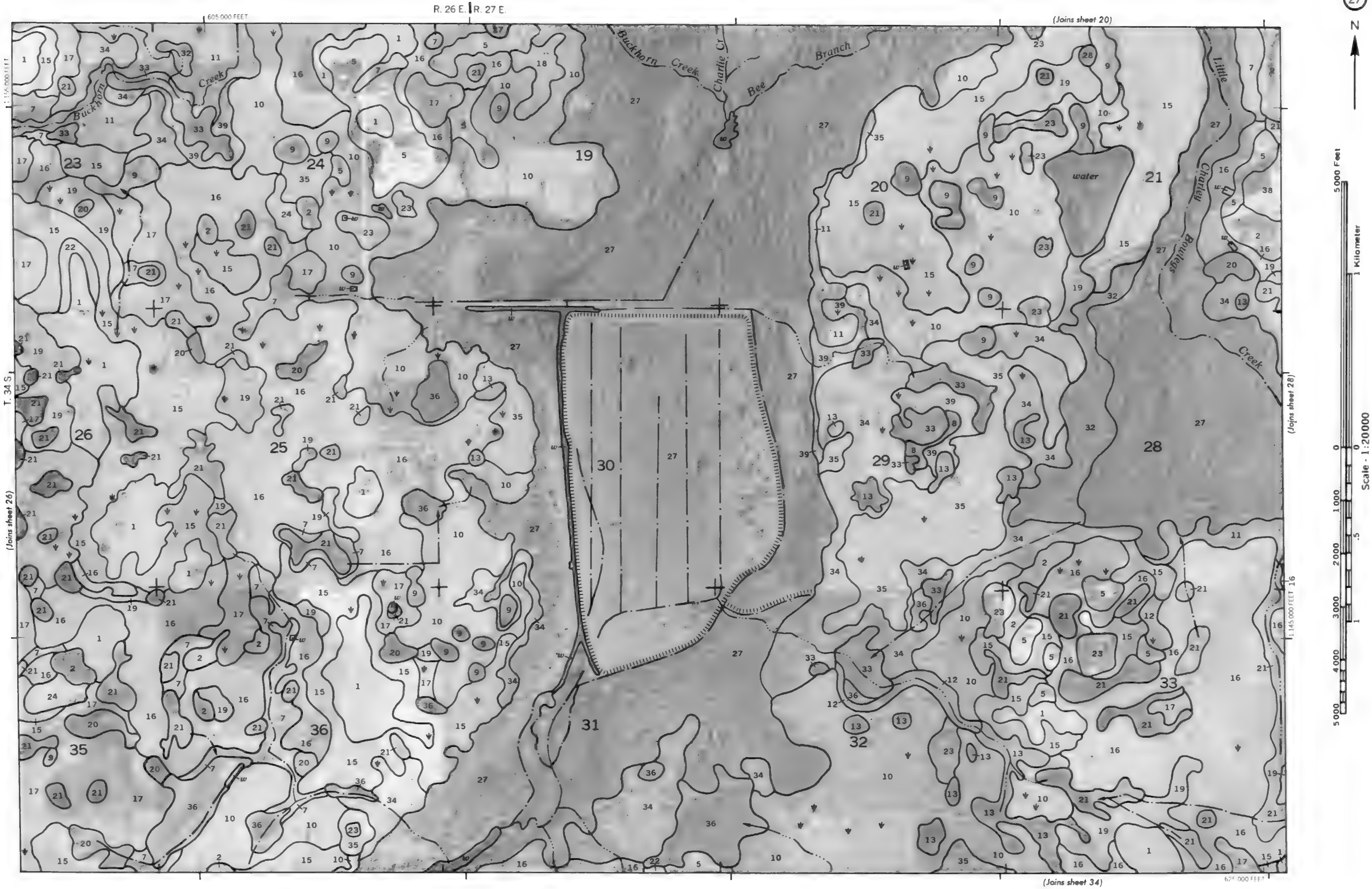


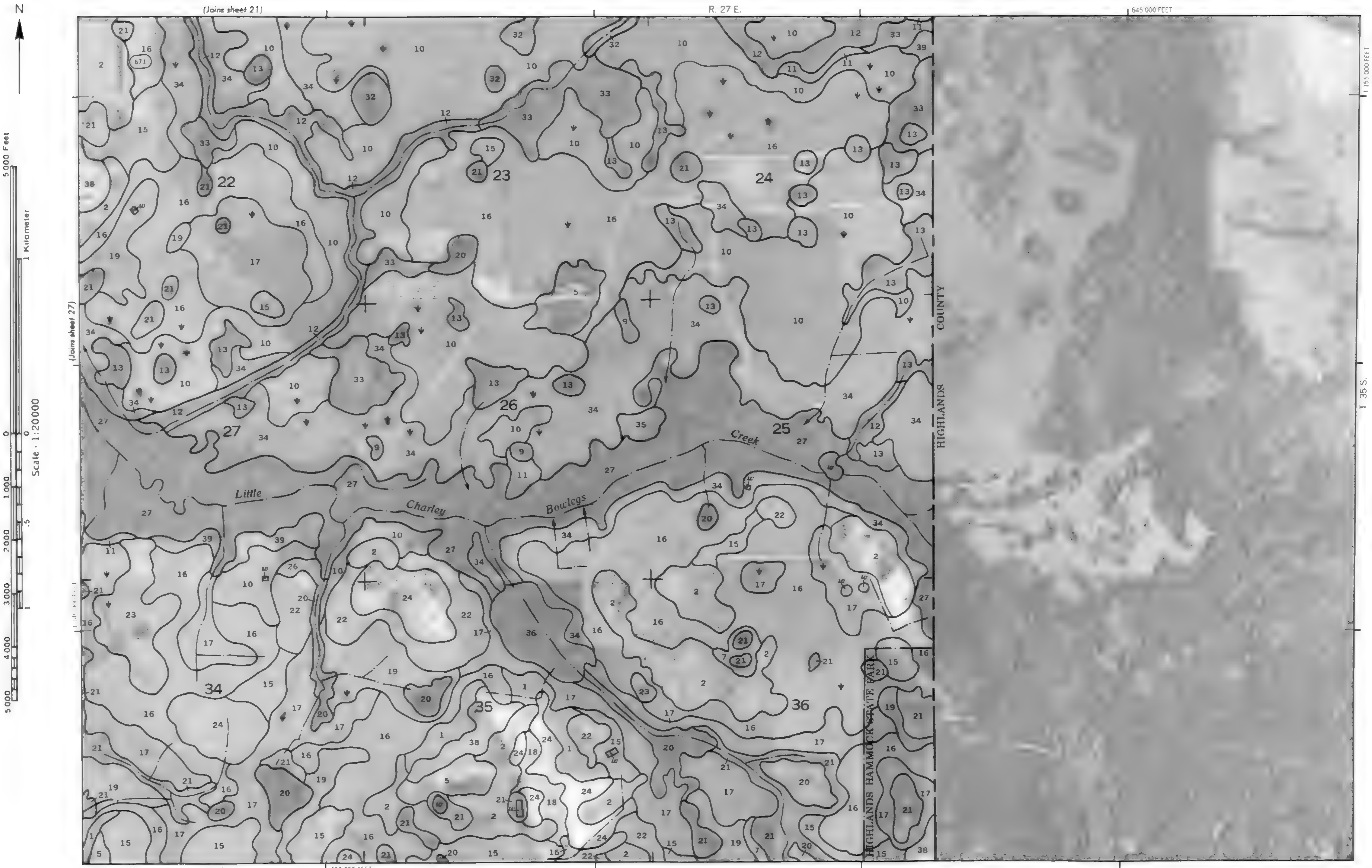
23
N
R. 23 E.
R. 24 E.
(Joins sheet 16)
(Joins sheet 24)
(Joins sheet 22)
(Joins sheet 30)
T. 34 S.
SEABOARD
COAST
LINE
Brushy
Creek
Oak
Creek
Ona
5000 Feet
1 Kilometer
Scale 1:20000

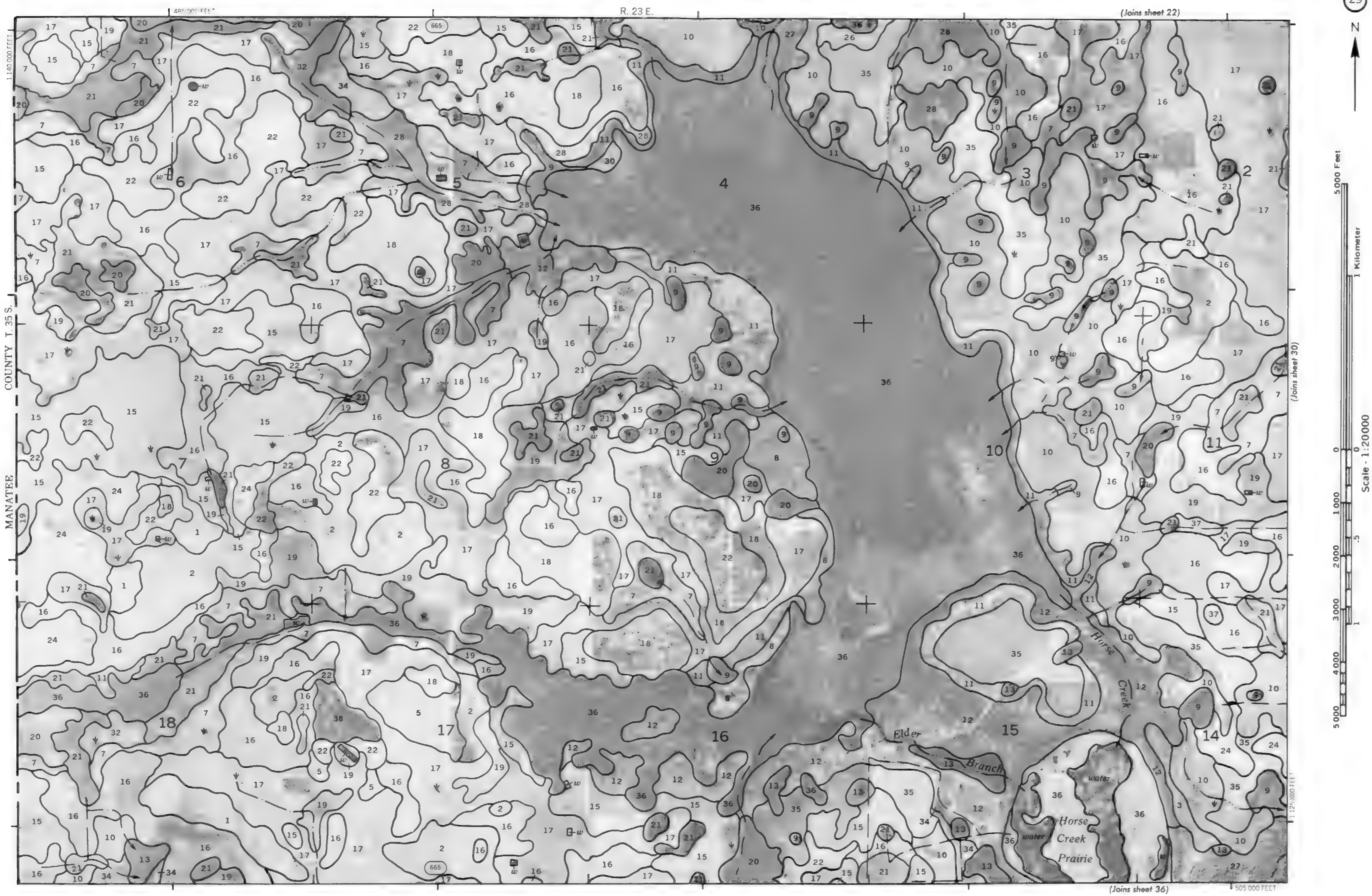

N
5000 Feet
1 Kilometer
Scale 1:20000
(Joins sheet 17)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 31)
R. 24 E.
R. 25 E.
T. 34 S.
Hickory Creek
Troublesome Creek
Oak Grove

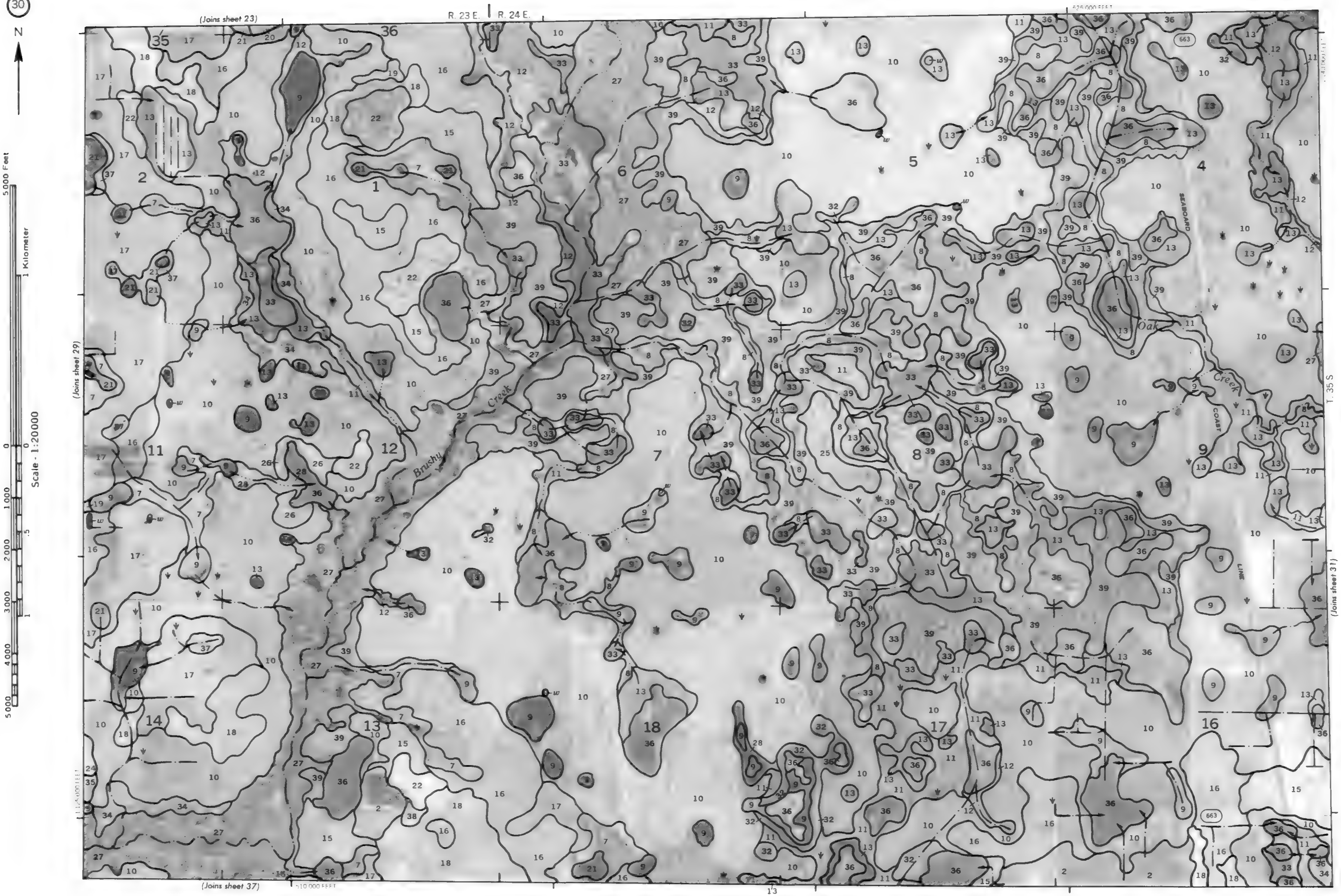

25
N
R 25 E.
(Joins sheet 18)
(Joins sheet 26)
(Joins sheet 24)
(Joins sheet 32)
T 34 S.
PEACE
RIVER
SEABOARD
COAST
LINE
Zolfo
Springs
Alligator
Branch
5000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1


N
(Joins sheet 19)
R. 26 E.
600 000 FEET
(Joins sheet 25)
T. 34 S.
(Joins sheet 27)
580 000 FEET
(Joins sheet 33)
5000 Feet
1 Kilometer
Scale 1:20000

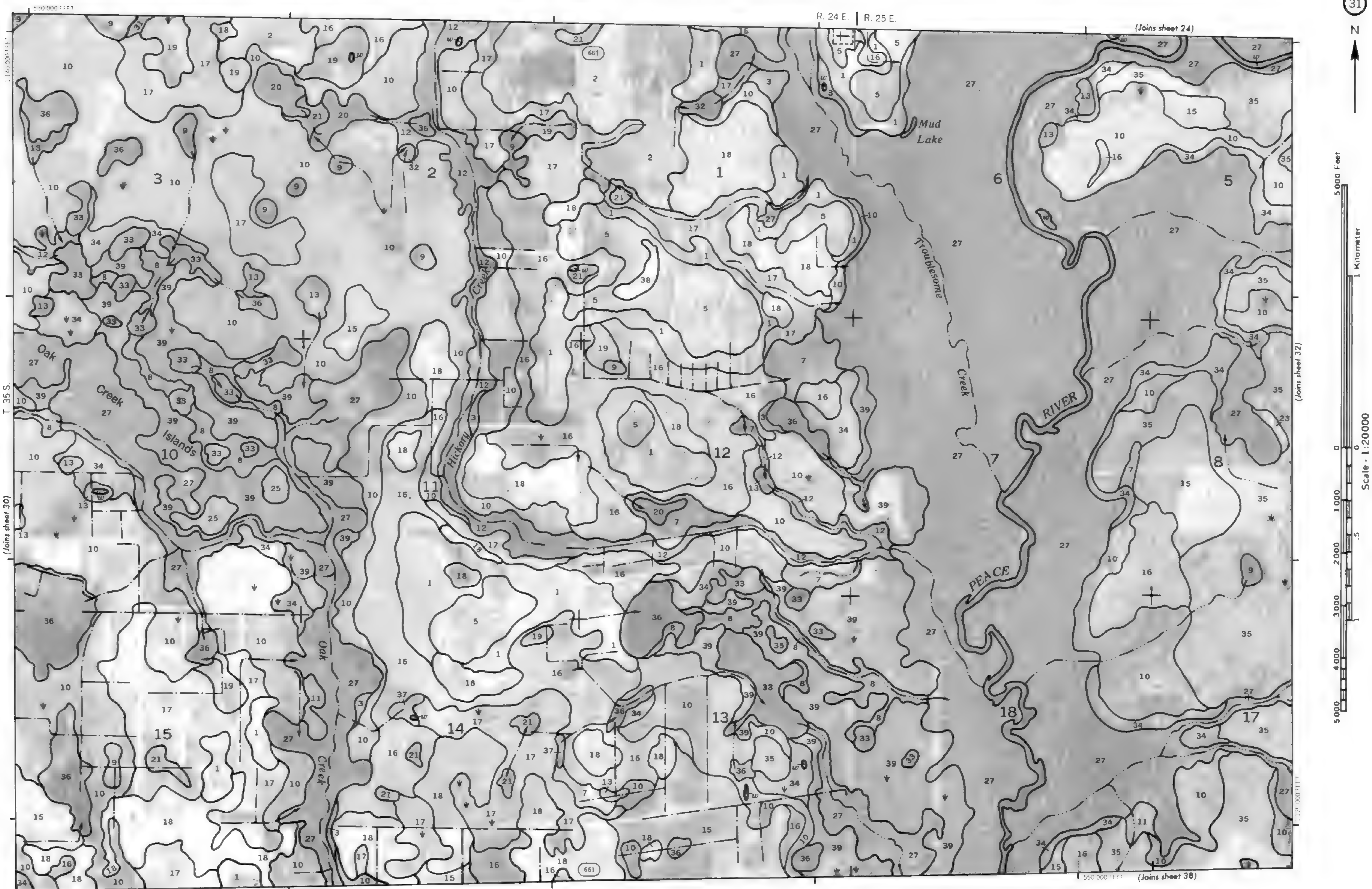

27
R. 26 E. R. 27 E.
605 000 FEET
(Joins sheet 20)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 34)
T. 34 S.
Buckhorn Creek
Charlie Cr.
Bee Branch
Little Charley Bowlegs Creek
water
N
5 000 Feet
1 Kilometer
Scale - 1:20000

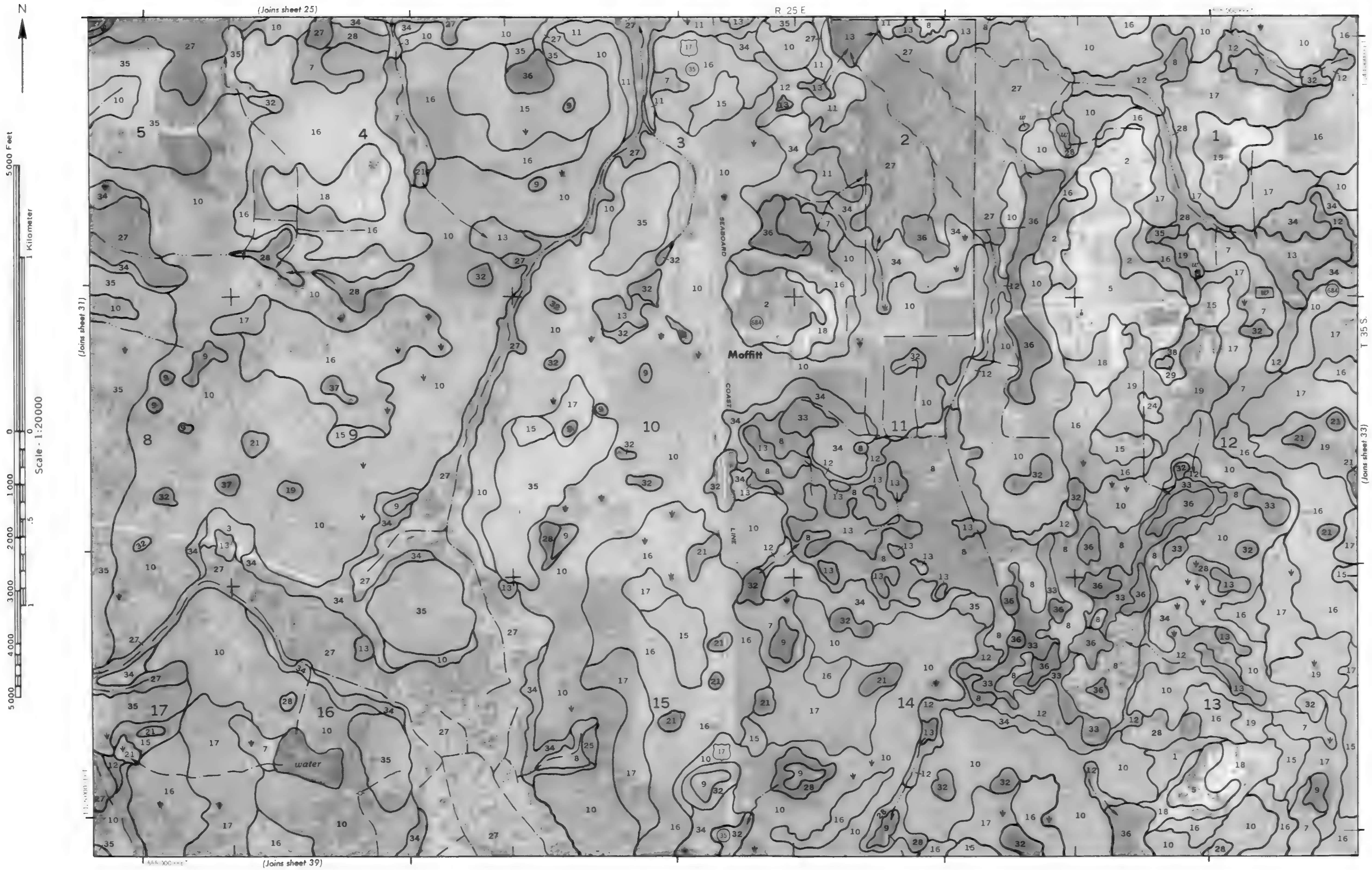

N
5000 Feet
1 Kilometer
Scale 1:20000
(Joins sheet 21)
R. 27 E.
645 000 FEET
(Joins sheet 27)
T. 35 S.
HIGHLANDS COUNTY
Little Charley Bowlegs Creek
HIGHLANDS HAMMOCK STATE PARK
(Joins sheet 35)
630 000 FEET

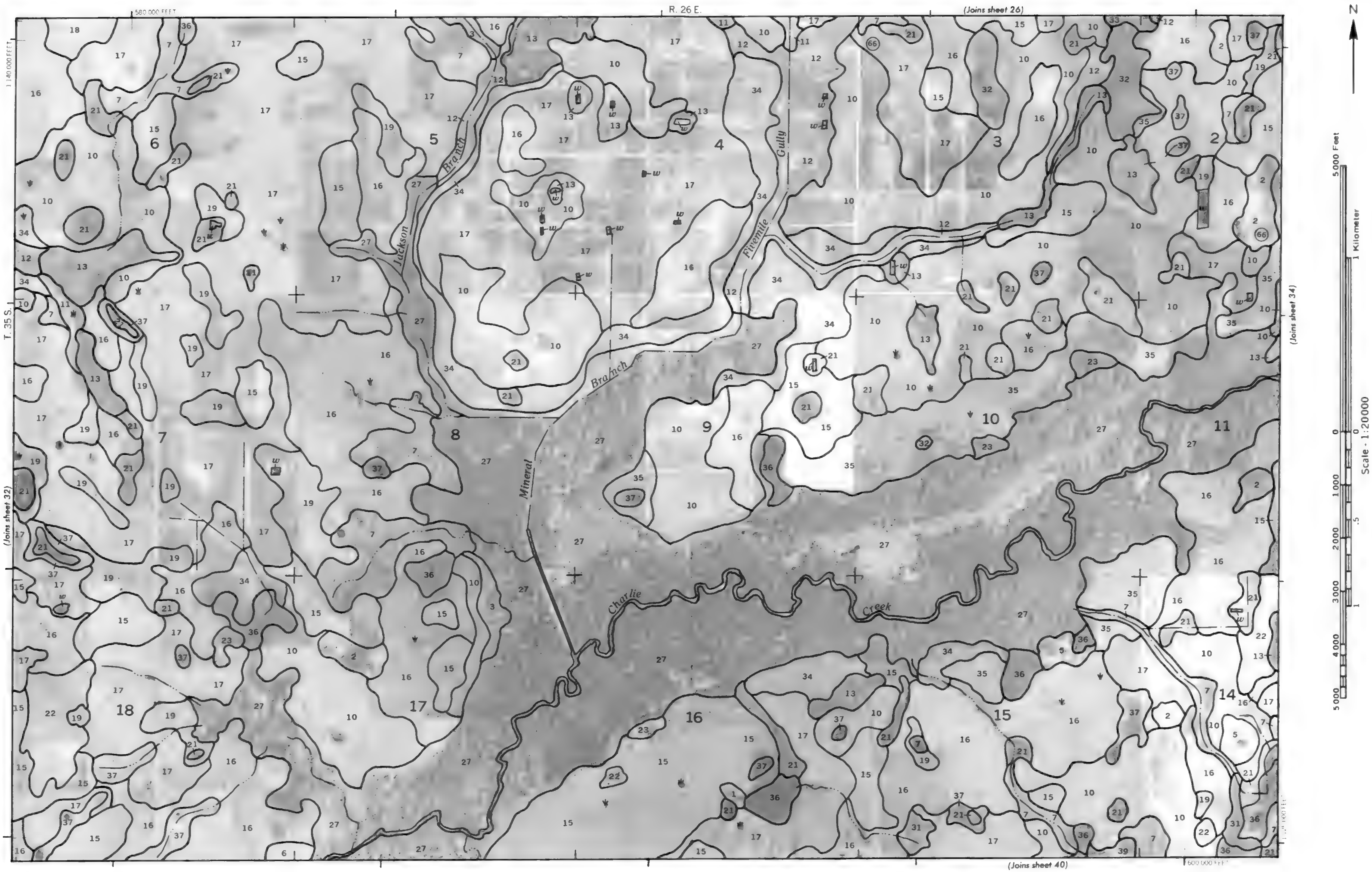

29
N
R. 23 E.
(Joins sheet 22)
(Joins sheet 30)
(Joins sheet 36)
MANATEE COUNTY T. 35 S.
Elder Branch
Horse Creek
Horse Creek Prairie
water
665
5000 Feet
1 Kilometer
Scale - 1:20000
505 000 FEET

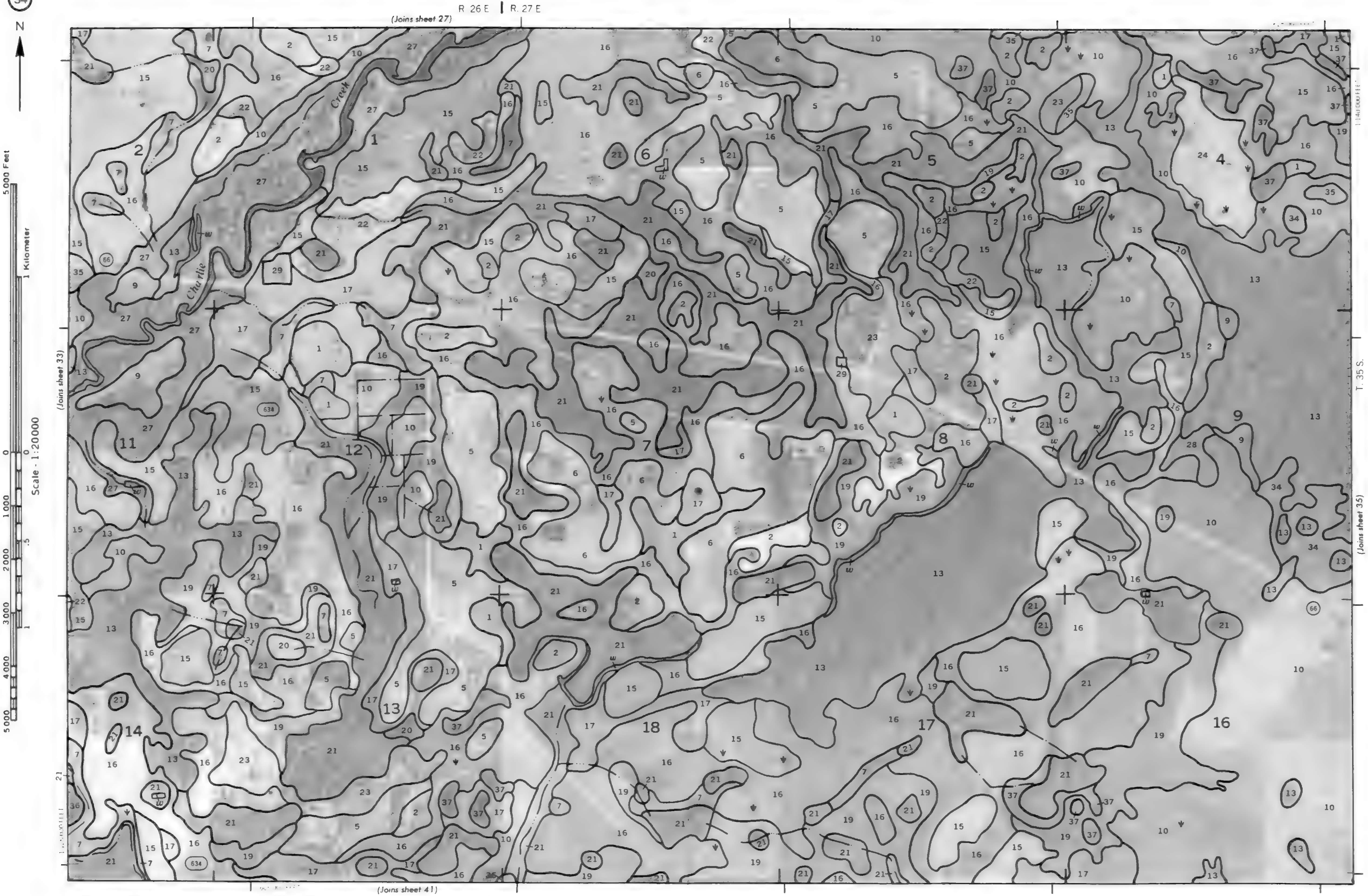

30
N
(Joins sheet 23)
R. 23 E.
R. 24 E.
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 37)
T. 35 S.
Brushy Creek
Oak Creek
SEABOARD COAST LINE
663
5000 Feet
1 Kilometer
Scale 1:20000

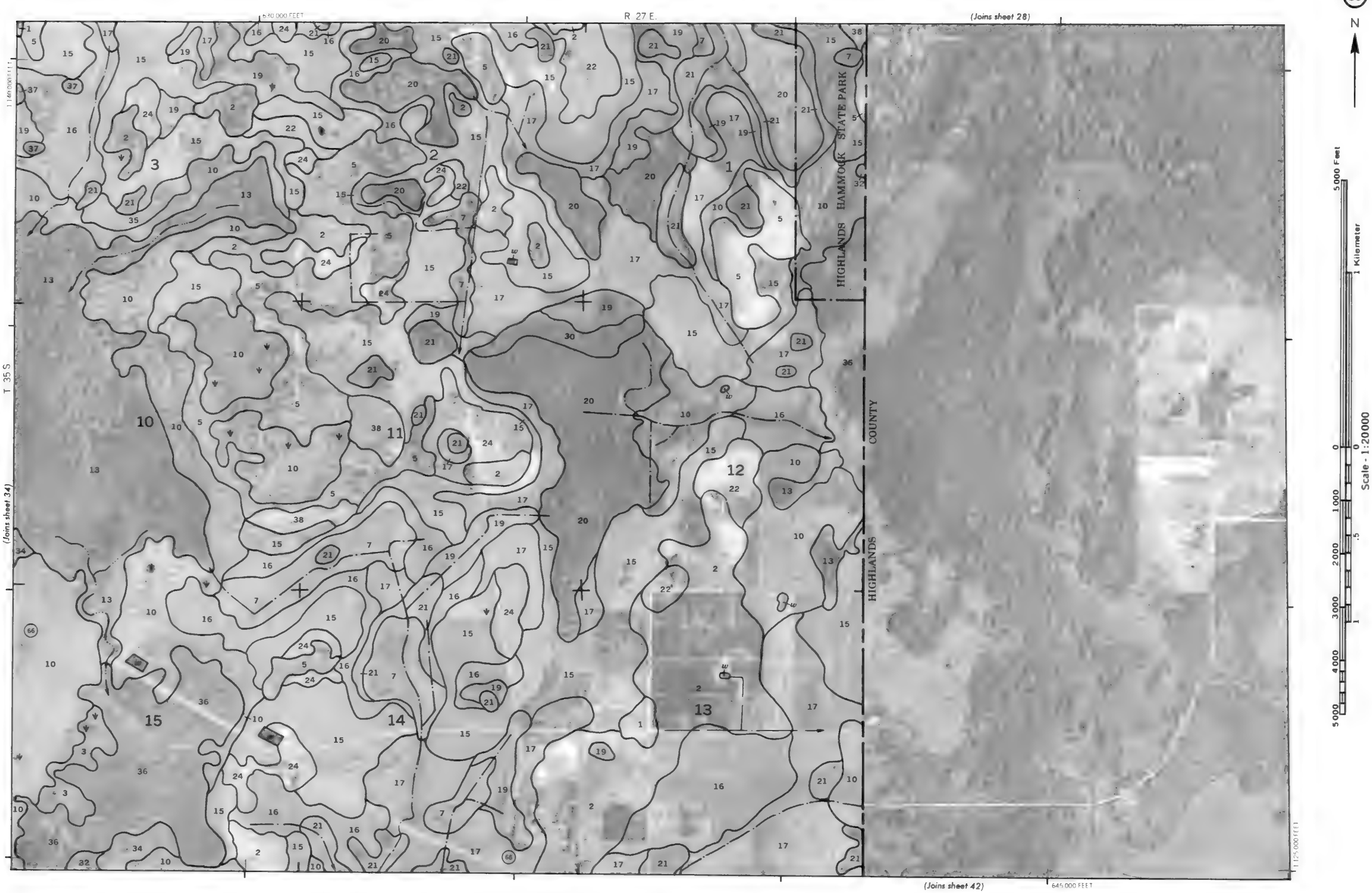
HARDEE COUNTY, FLORIDA — SHEET NUMBER 31



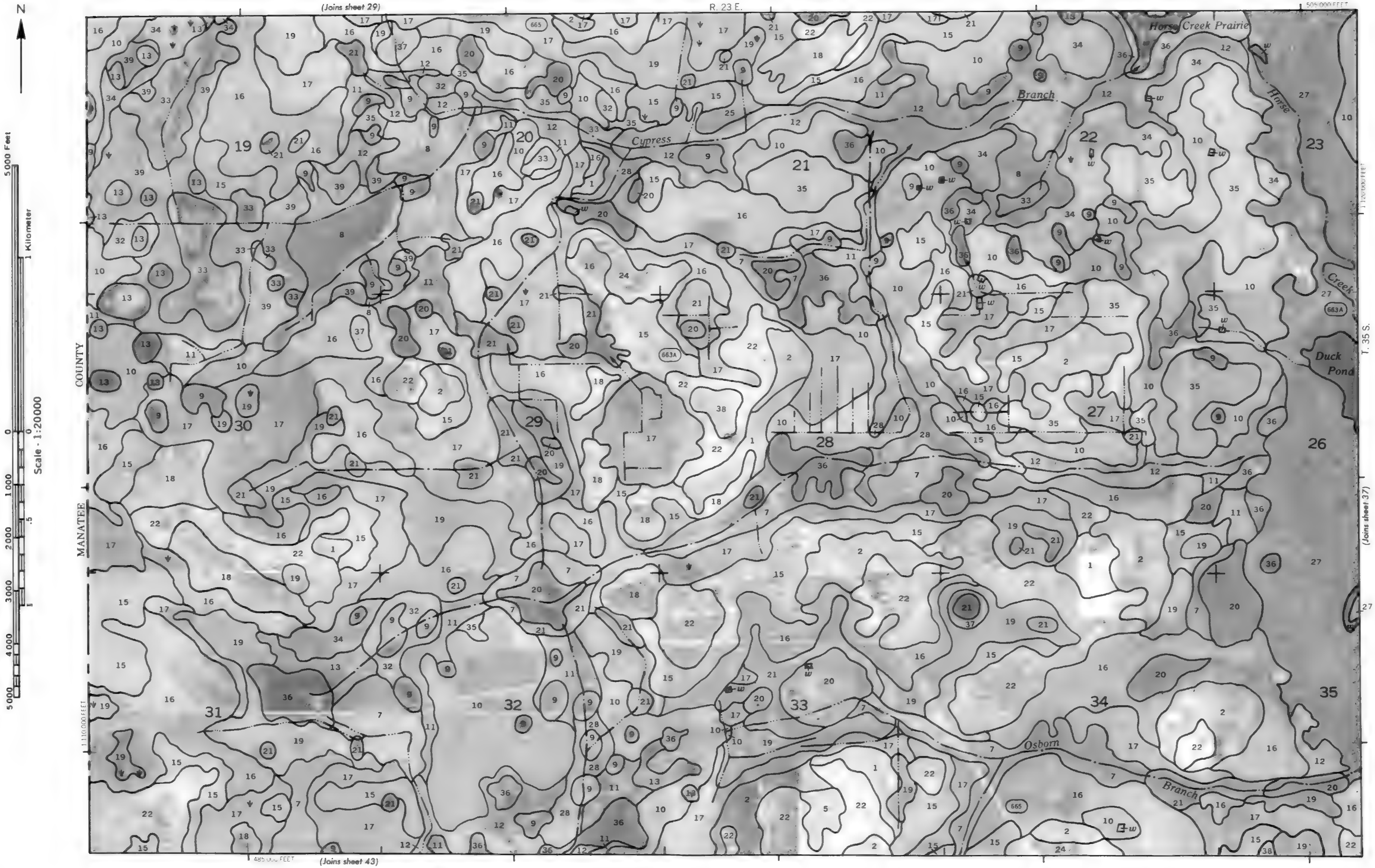

N
5000 Feet
1 Kilometer
Scale - 1:20000
(Joins sheet 25)
R 25 E
(Joins sheet 31)
(Joins sheet 33)
T 35 S.
SEABOARD
COAST
LINE
Moffitt
water
(Joins sheet 39)

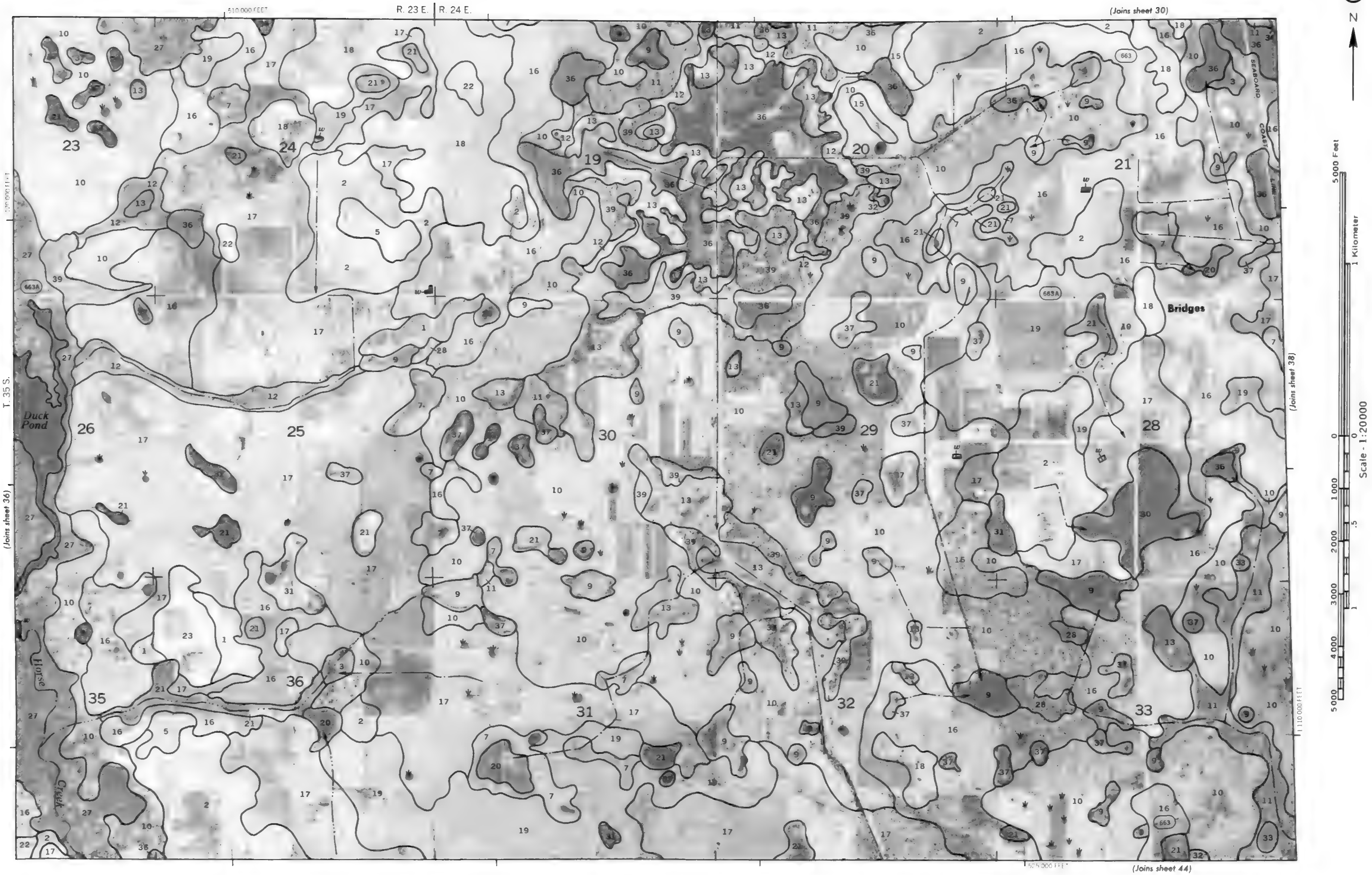

N
580 000 FEET
R. 26 E.
(Joins sheet 26)
1 140 000 FEET
T. 35 S.
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 40)
600 000 FEET
Jackson Branch
Fivemile Gully
Mineral Branch
Charlie Creek
5000 Feet
1 Kilometer
Scale - 1:20000

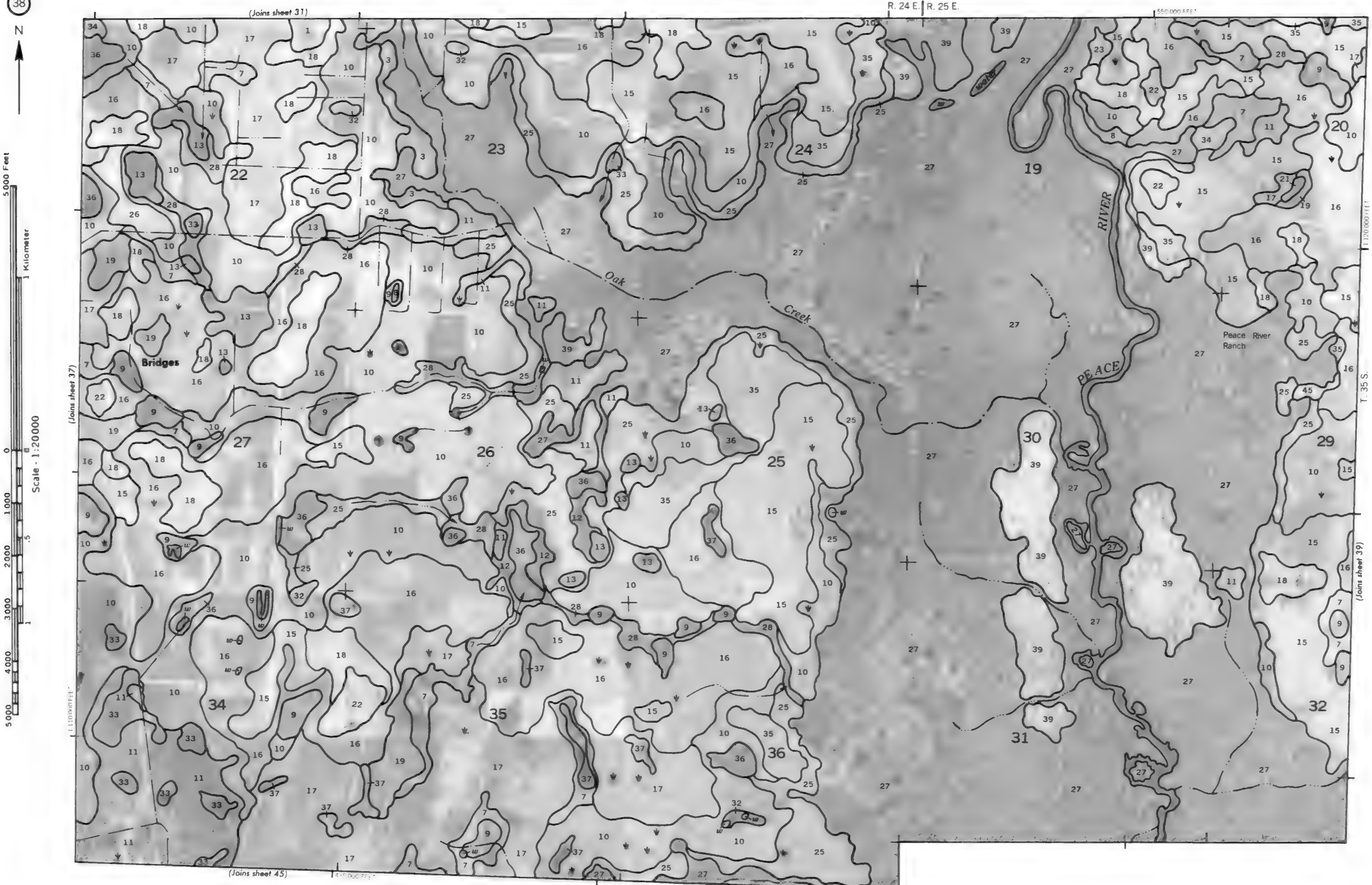

R. 26 E.
R. 27 E.
(Joins sheet 27)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 41)
T. 35 S.
N
5 000 Feet
1 Kilometer
Scale 1:20000
Charlie
Creek


35
N
R 27 E.
630 000 FEET
(Joins sheet 28)
1 140 000 FEET
T 35 S
(Joins sheet 34)
HIGHLANDS HAMMOCK STATE PARK
HIGHLANDS COUNTY
(Joins sheet 42)
645 000 FEET
1 125 000 FEET
5000 Feet
1 Kilometer
Scale - 1:20000

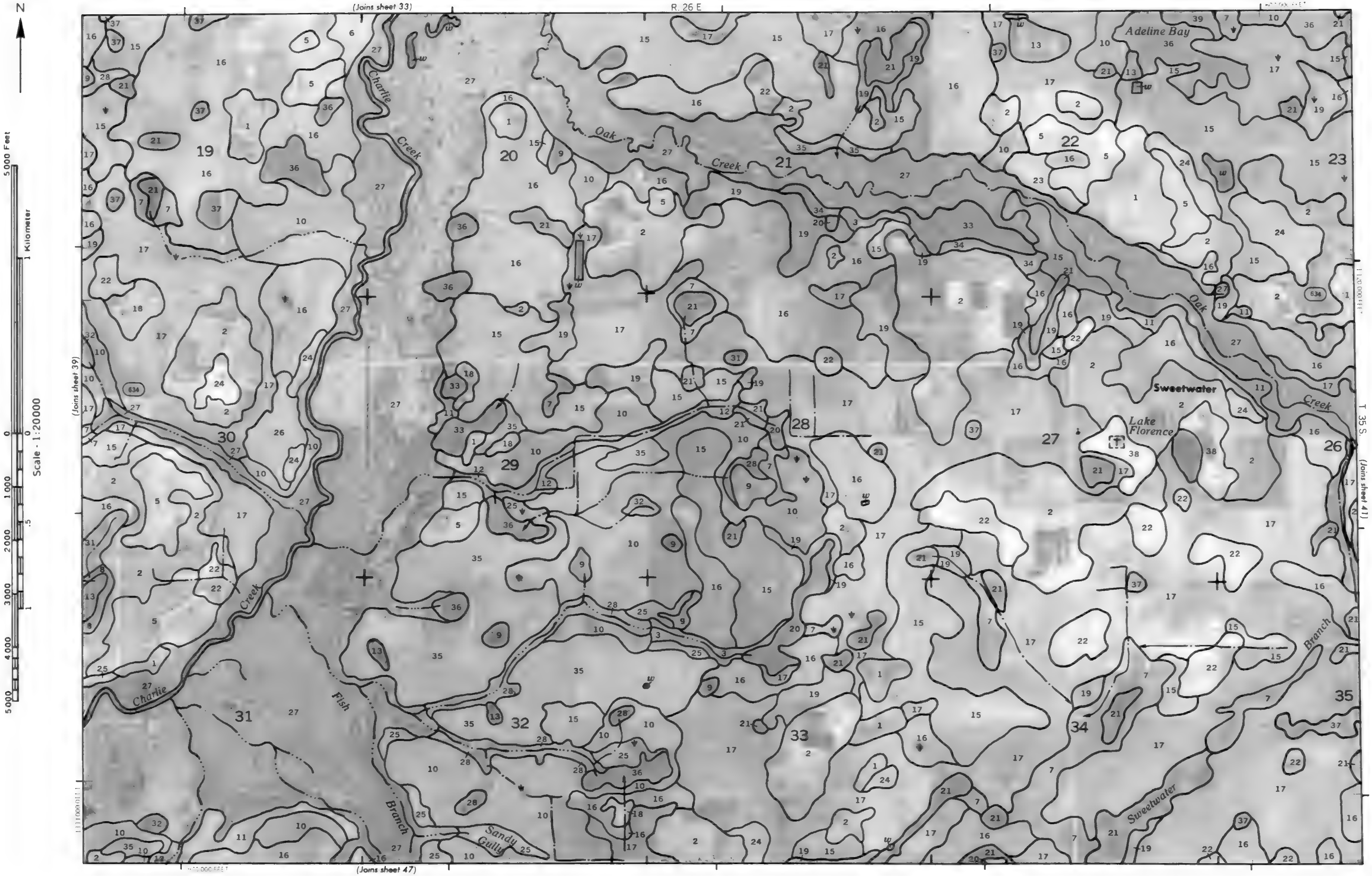
HARDEE COUNTY, FLORIDA — SHEET NUMBER 36



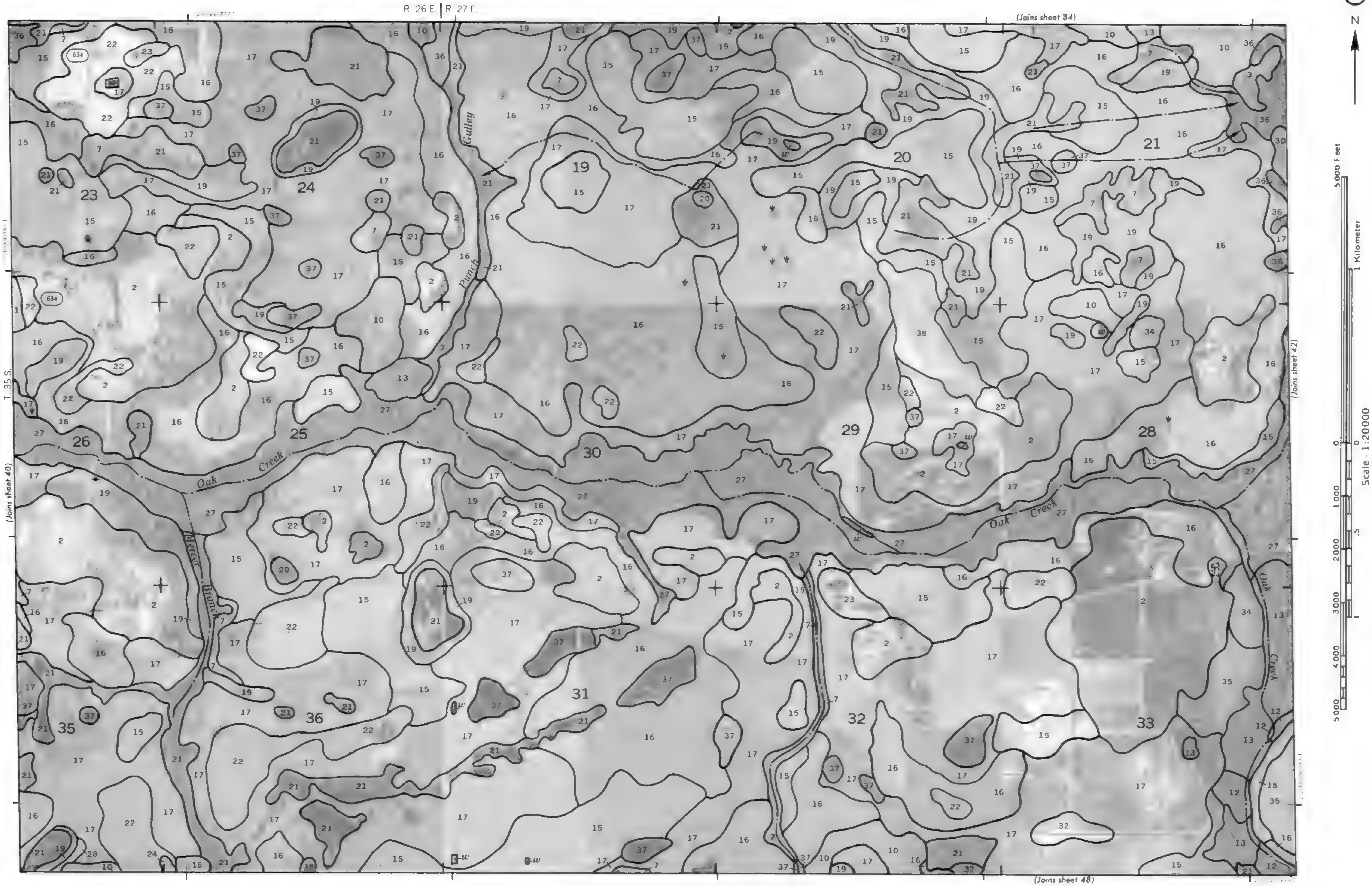

510 000 FEET
R. 23 E.
R. 24 E.
(Joins sheet 30)
(Joins sheet 36)
(Joins sheet 38)
(Joins sheet 44)
T. 35 S.
Duck Pond
Horse Creek
Bridges
SEABOARD COAST LINE
663A
663
N
5000 Feet
1 Kilometer
Scale - 1:20000

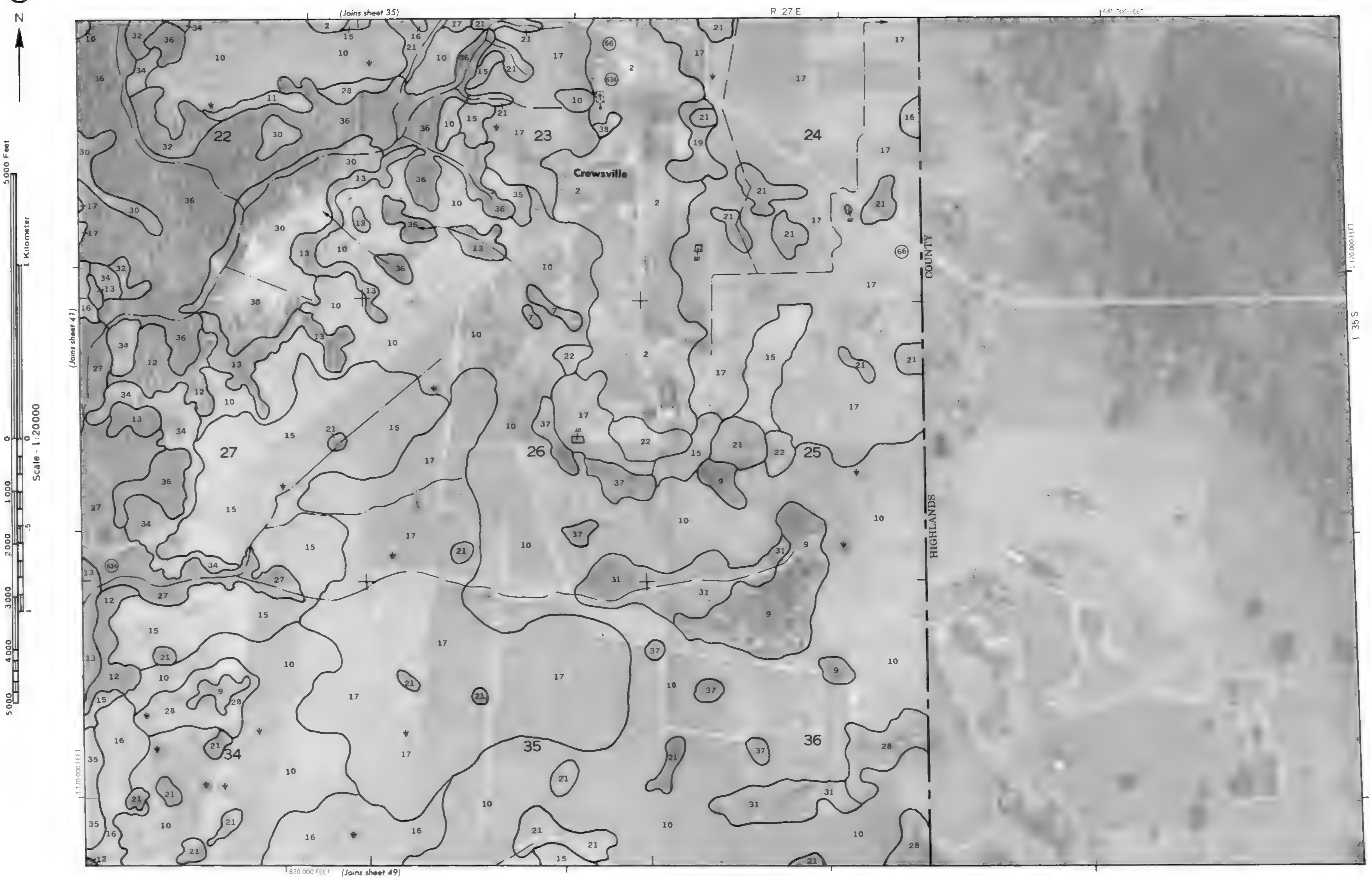

N
(Joins sheet 31)
R. 24 E.
R. 25 E.
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 45)
T. 35 S.
Bridges
Oak Creek
PEACE RIVER
Peace River Ranch
5000 Feet
1 Kilometer
Scale 1:20000

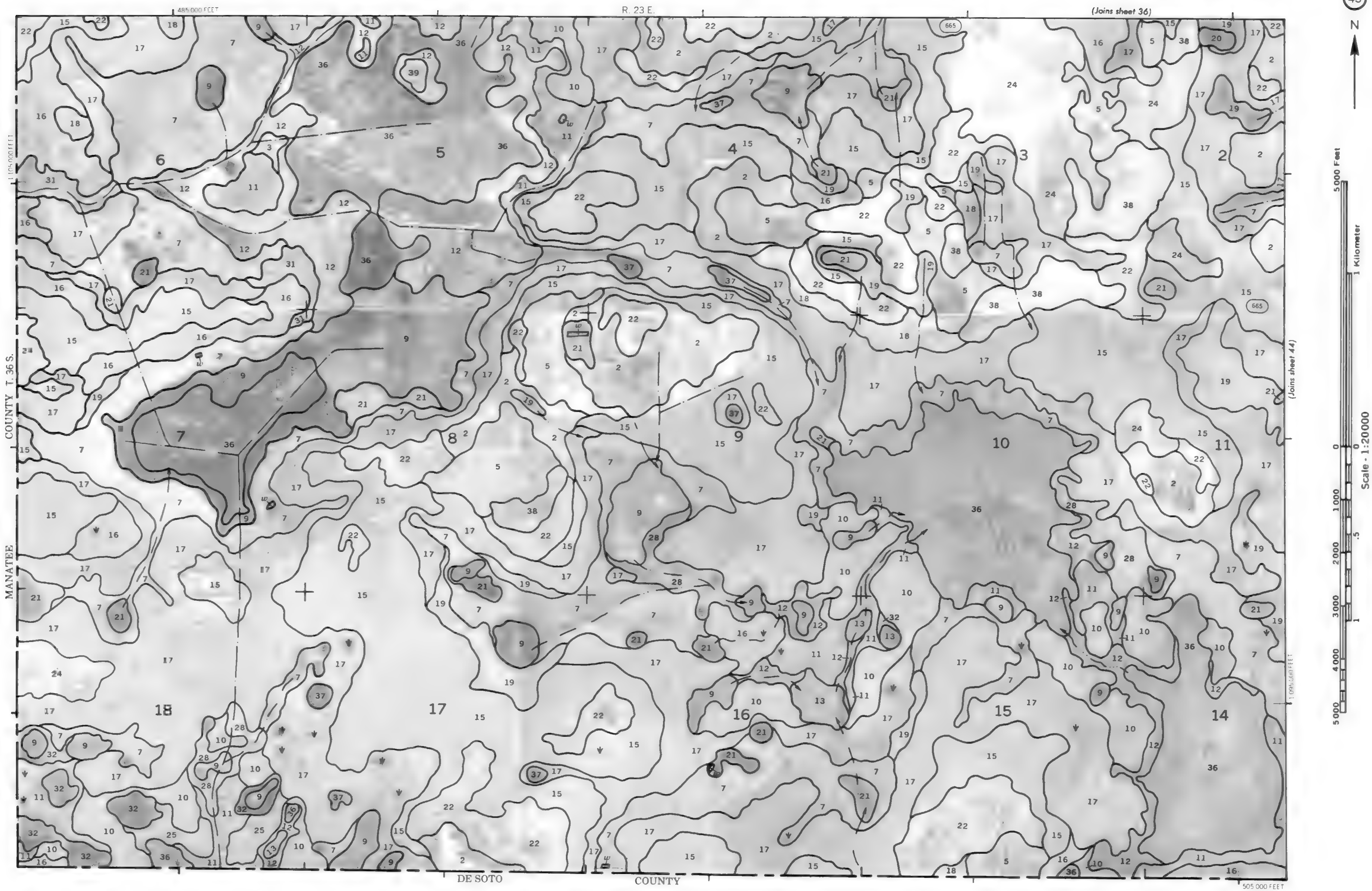

39
N
R 25 E
(Joins sheet 32)
(Joins sheet 40)
(Joins sheet 46)
(Joins sheet 38)
T. 35 S.
Buchanan
COAST
LINE
SEABOARD
Charlie
Creek
5000 Feet
1 Kilometer
Scale - 1:20000

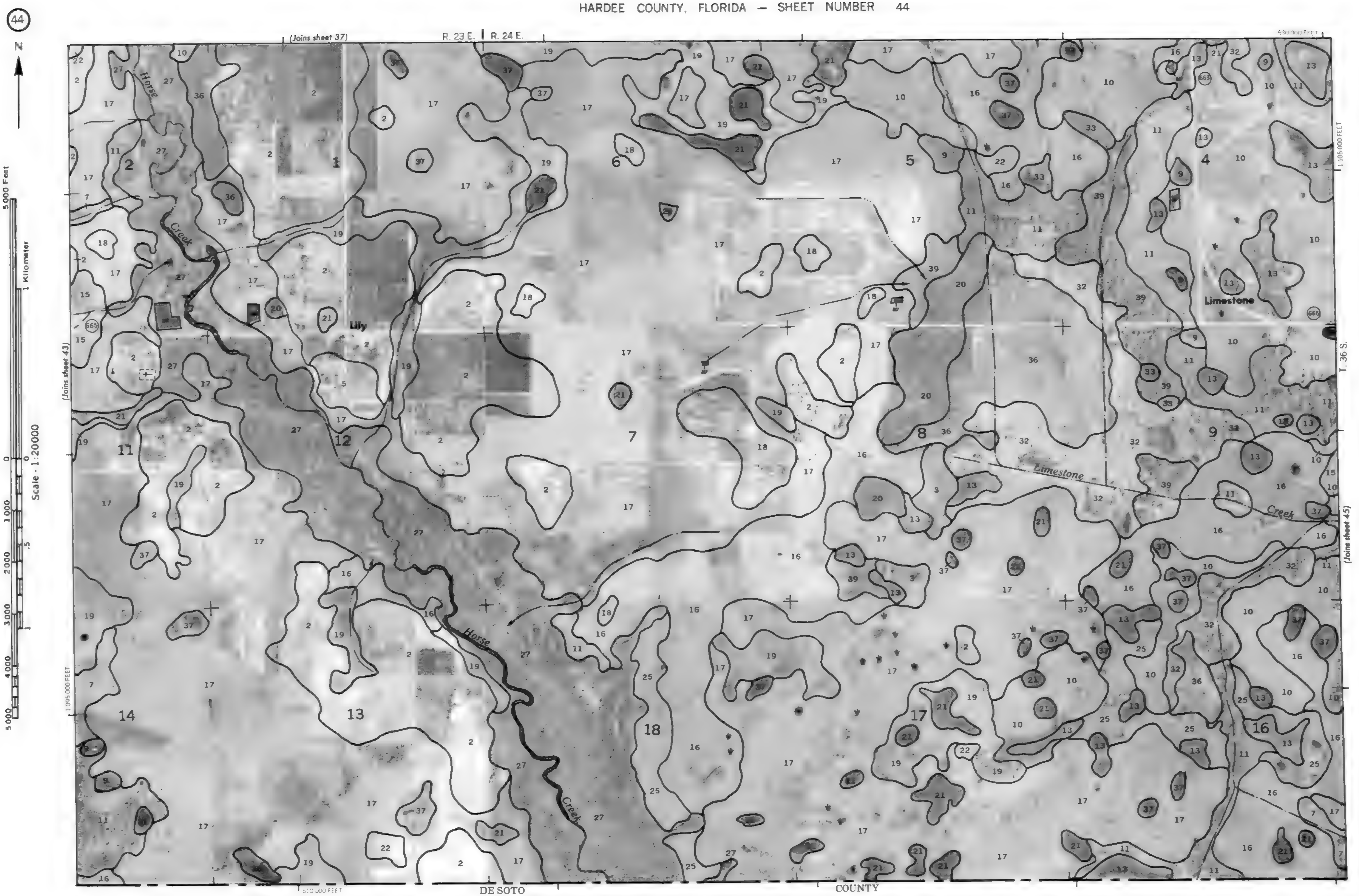

N
(Joins sheet 33)
R. 26 E.
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 47)
T. 35 S.
5 000 Feet
1 Kilometer
Scale - 1:20000
Charlie Creek
Oak Creek
Adeline Bay
Sweetwater
Sweetwater Creek
Lake Florence
Fish Branch
Sandy Gully
Branch
Sweetwater
634
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35

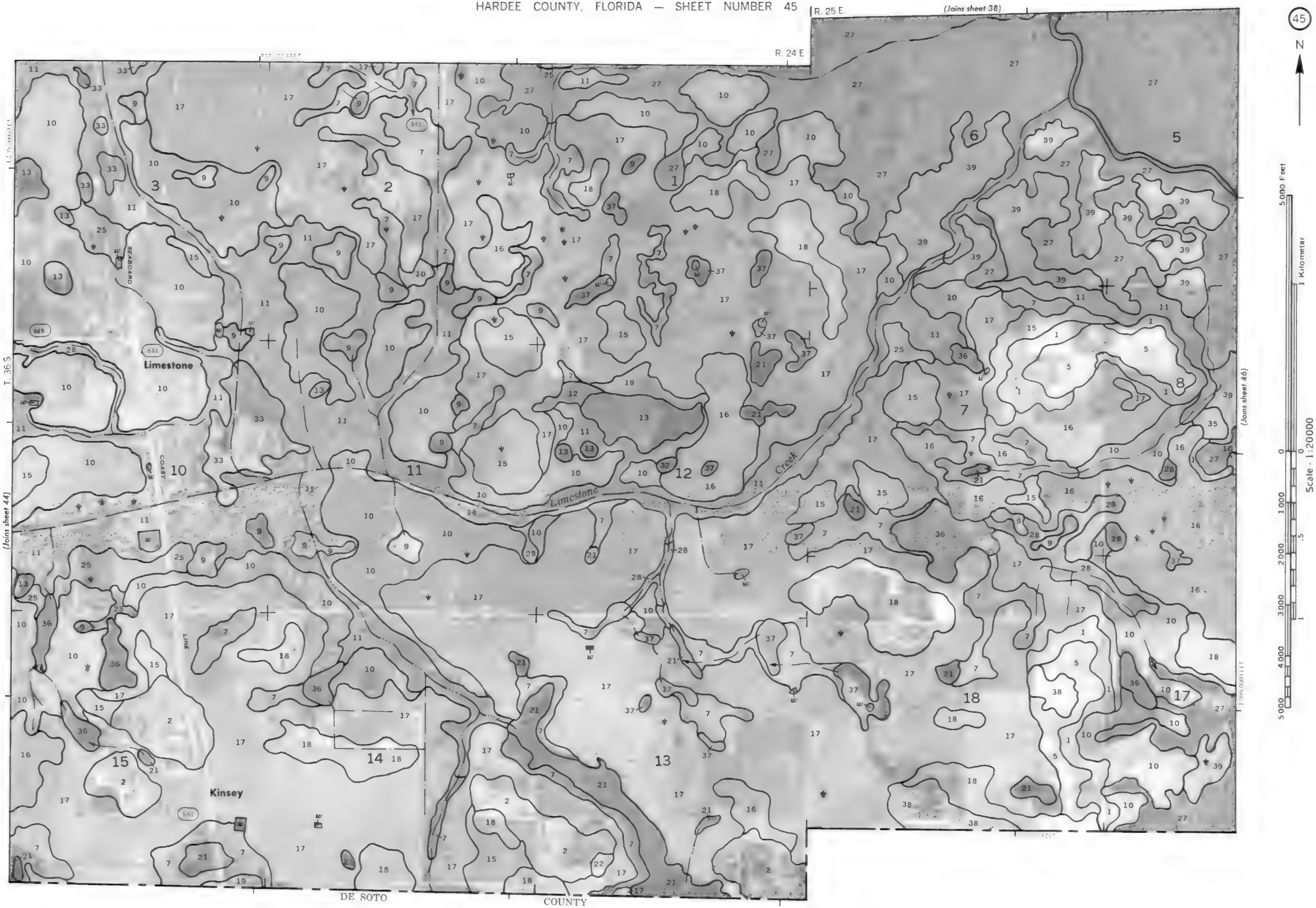
41


R. 26 E. | R. 27 E.
(Joins sheet 34)
(Joins sheet 42)
(Joins sheet 48)
(Joins sheet 40)
T. 35 S.
Gulley
Punch
Oak Creek
Mercer Branch
Oak Creek
N
5000 Feet
1 Kilometer
Scale - 1:20000


42
N
(Joins sheet 35)
R 27 E
(Joins sheet 41)
(Joins sheet 49)
Crewsville
HIGHLANDS COUNTY
T 35 S
5000 Feet
1 Kilometer
Scale - 1:20000
630 000 FEET


485 000 FEET
R. 23 E.
(Joins sheet 36)
(Joins sheet 44)
MANATEE COUNTY T. 36 S.
DE SOTO COUNTY
505 000 FEET
665
N
5000 Feet
1 Kilometer
Scale - 1:20000

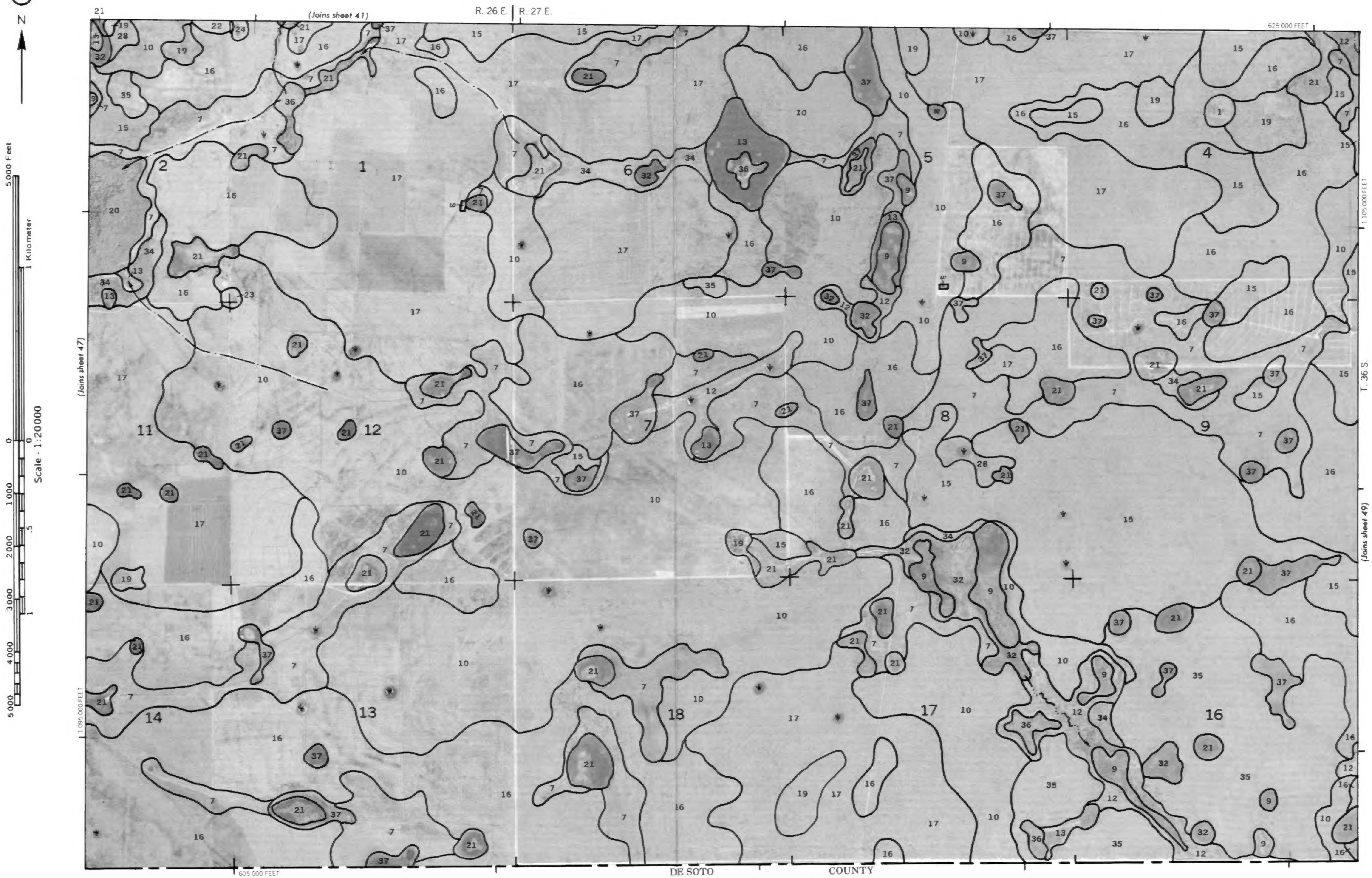

44
N
(Joins sheet 37)
R. 23 E.
R. 24 E.
530 000 FEET
1 105 000 FEET
T. 36 S.
(Joins sheet 43)
(Joins sheet 45)
Horse
Creek
Lily
Limestone
Limestone
Creek
Horse
Creek
1 095 000 FEET
510 000 FEET
DE SOTO
COUNTY
5000 Feet
1 Kilometer
Scale 1:20000
0
1000
2000
3000
4000
5000
0
.5
1


45
R. 25 E.
(Joins sheet 38)
R. 24 E
T. 36 S
(Joins sheet 44)
(Joins sheet 46)
Limestone
SEABOARD
COAST
LINE
Limestone Creek
Kinsey
661
665
DE SOTO
COUNTY
N
5000 Feet
1 Kilometer
Scale 1:20000

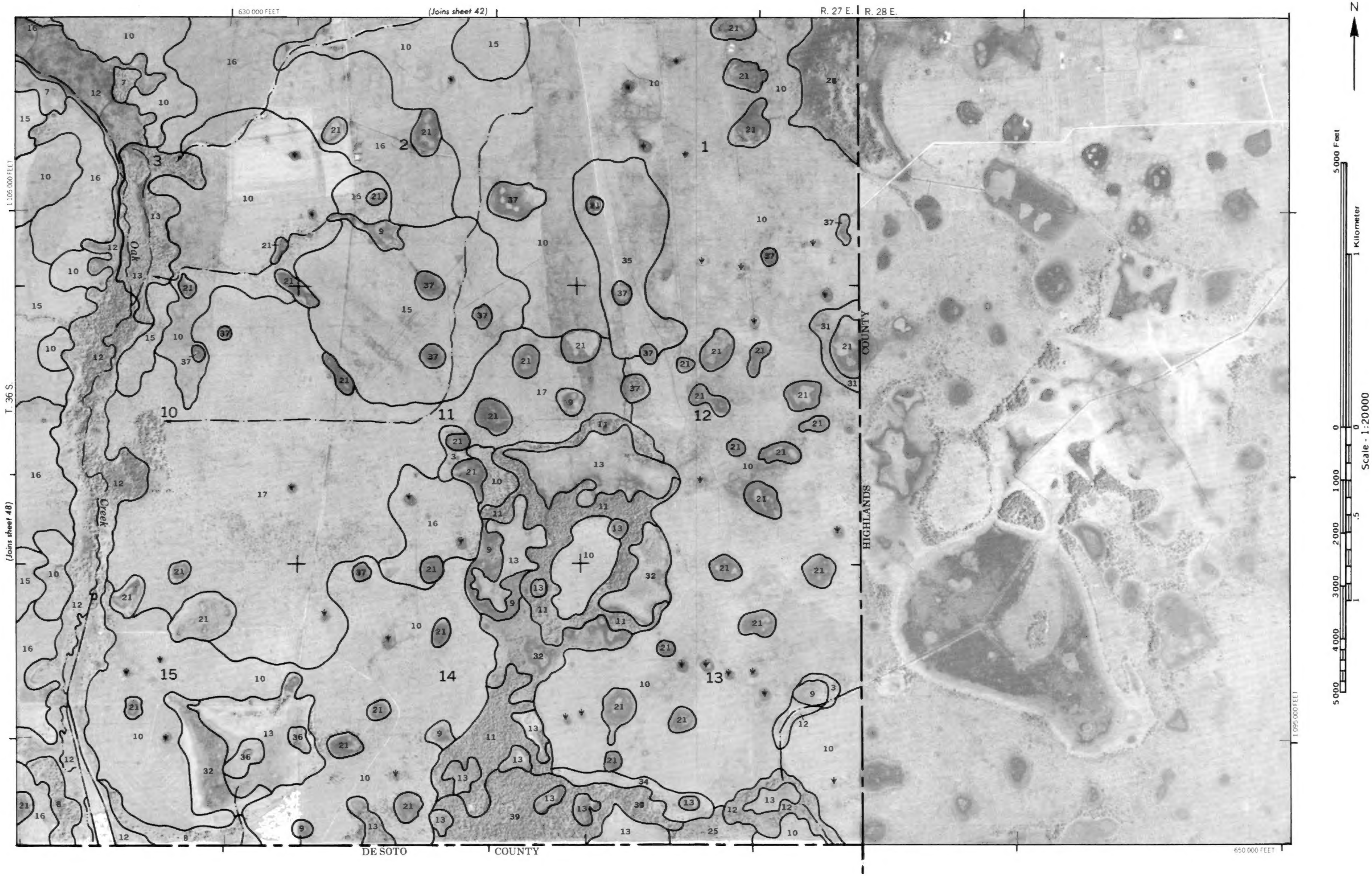
46


N
5000 Feet
1 Kilometer
Scale - 1:20000
(Joins sheet 39)
R. 25 E.
575 000 FEET
1 105 000 FEET
T. 36 S.
(Joins sheet 45)
(Joins sheet 47)
1 095 000 FEET
555 000 FEET
Charlie
Creek
PEACE
RIVER
SEABOARD
COAST
LINE
Gardner
water
665
35
17
DE SOTO
COUNTY


580 000 FEET
R. 26 E.
(Joins sheet 40)
N
1 105 000 FEET
T. 36 S.
(Joins sheet 46)
(Joins sheet 48)
Sand Gully Spring
Fish Branch
665
1 095 000 FEET
600 000 FEET
DE SOTO COUNTY
5000 Feet
1 Kilometer
Scale - 1:20000


N
(Joins sheet 41)
R. 26 E.
R. 27 E.
625 000 FEET
1 105 000 FEET
T. 36 S.
(Joins sheet 47)
(Joins sheet 49)
1 095 000 FEET
605 000 FEET
DE SOTO
COUNTY
5 000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
0
.5
1

49


(Joins sheet 42)
630 000 FEET
R. 27 E.
R. 28 E.
1 105 000 FEET
T. 36 S.
(Joins sheet 48)
Oak
Creek
HIGHLANDS
COUNTY
DE SOTO
COUNTY
1 095 000 FEET
650 000 FEET
N
5000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1